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ABSTRACT

This guide offers a nutrition education program for students in Kindergarten through Grade 6. Activities span all grades as well as activities for the specific level. Nutrition education objectives are stated for each grade level: (1) grade four--students will explore how to balance food intake and energy output for overall health and physical fitness; (2) grade five--students will be motivated to eat nutritious foods because they understand why the human body needs certain nutrients to function; and (3) grade six--students will become motivated to conserve food and food-related resources. An explanation is given of what the students should understand about the objective for each level. Activities for Grade 4 help students to: (1) establish that energy is needed for all life processes; (2) examine the relationship between intake and expenditure of food energy; and (3) focus on how technological changes have affected personal energy expenditure. A supplement to this guide contains worksheets, letters for parents, and recipes. A Spanish translation of the letters for parents is provided. (JD)

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NUTRITION COMES ALIVE

Level 4

Nutrition Educator's Guide
New York State
Revised Edition

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Nutrition Comes Alive

Level 4
The Great Balancing Act

Nutrition Educator's Guide

A Revision by Laurie Waldron

Based on materials developed by Martha L. Plass

Division of Nutritional Sciences, a division of the New York State College of Human Ecology and the New York State College of Agriculture and Life Sciences, Cornell University, Ithaca, New York 14853. 1986.

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Martha C. Mapes

Coordinator, K–6 Revision
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Foreword

Why Nutrition Education

Our diets are shaped early in our lives by emotional, cultural, and social forces, as well as by the availability of certain foods. Traditions, food habits of parents and friends, and food advertising are some factors that influence American diets. Bombarded by numerous options, children should not be expected automatically to select nutritious foods. They must learn how to make nutritious choices from the array of foods available.

The ultimate goal of nutrition education is to provide knowledge and to foster skills that will promote nutritionally sound eating practices, which in turn contribute to an individual's nutritional well-being and overall health. Nutrition education should begin when children are young and in the process of developing their eating habits. Early positive experiences with nutritious foods help create a foundation for lifelong eating habits, nutritional awareness, and attitudes that facilitate good health.

Preface

Developing Thinking Skills

For children to develop good habits for nutritional well-being, we must help them learn to make intelligent food choices. Making intelligent choices depends on their ability to analyze and evaluate foods within the context of their world, which includes fast-food restaurants, vending machines, and convenience foods. Rather than ignore the influence of such modern-day phenomena, we must teach children to evaluate the foods available from such sources so they can make appropriate selections. As stated by Isobel Contento, Teachers College, Columbia University:

> Today's consumer or learner needs, on the cognitive level, to know how to select from the vast array of foods in the average supermarket those foods he or she needs for optimal health in today's context. He or she also needs to know how to be discriminating about dietary advice that comes, sought and unsought, from a variety of unequally reliable sources such as popular books, advertising, packaging labels, newspapers, and materials from food industry sources or "health" food stores.
>
> On an affective level, the learner needs to learn self restraint—particularly in light of the sedentary life-styles of most Americans, and to develop attitudes toward food selection that are conducive to long-term health.*

Developing the thinking skills of our students seems the most effective way to proceed. If we use practical examples to help students sort out the choices available and identify various nutritional options, we are helping them face this complex world of food and eating. Therefore it would seem more important for students to be able to differentiate between opinion and fact when viewing advertisements than to be able to recite the nutrients in a given food. It may be more important for them to be able to search out and decipher the key nutritional information on a label than to name food groups important to health. If overnutrition is a problem involving excess fat, sugar, salt, or total calories, students need to be able to think about how to make modifications in food choices and ingredients within their own family and cultural traditions.

In other words, the focus of teaching should shift from transferring information to the student to processing information by the student; at least, we should strive for a better balance. Teachers can help provide practical situations so students can practice using their thinking skills to take increasing personal responsibility for their food choices. This curriculum guide is offered as a way to help make this goal possible.

*Isobel Contento, "Thinking about Nutrition Education: What to Teach, How to Teach It, and What to Measure," ***Teachers College Record*** 81 (Summer 1980): 422–23.

Overview of Nutrition Education, Grades 4–6

For each grade level one major nutrition objective is supported by several understandings. The suggested activities and work sheets are intended to help students achieve the understandings and objectives.

Grade Level	Objectives/Understandings
Grade 4	Objective: Students will explore how to balance food intake and energy output for overall health and physical fitness. Understandings: 1. Energy is needed for all life processes. 2. Three nutrients in food provide our bodies with energy for daily living and activity. 3. Changes in eating patterns and exercise levels resulting from technological changes affect a person's ability to maintain energy balance.
Grade 5	Objective: Students will be motivated to eat nutritious foods because they understand why the human body needs certain nutrients to function. Understandings: 1. Human beings, like all living things, are composed of microscopic cells. 2. All cells need nutrients for energy, growth, maintenance, and repair, and these nutrients come from food. 3. As food is digested by the body, nutrients are released and carried by the blood to the waiting cells.
Grade 6	Objective: Students will become motivated to conserve food and food-related resources. Understandings: 1. Food is wasted at home, in school, and throughout the community. 2. Much energy is required to produce, process, package, transport, and prepare food. 3. Sensible use of food and food-related resources can help protect our environment.

Nutrition Comes Alive

A Practical Classroom Tool

Nutrition Comes Alive is a nutrition education program developed by the Division of Nutritional Sciences, Cornell University, for elementary school students in grades K through 6. The guide for each grade level contains information relevant to the entire age span as well as activities for the specific level. The material for each grade level is intended to help you provide students with a multitude of learning opportunities. The activities, designed to stimulate student interest, are presented in an appealing, easy-to-use format. Special features of the guides are detailed below.

Integrates Activities

A key feature of the materials is that they may by integrated with other established academic subjects. Nutrition does not have to be taught as an isolated subject. It is a recognized part of most science, health, and social studies textbooks. The upper right-hand corner of each activity sheet indicates the subject area into which the activities best fit, for example, language arts, math, social studies, science, music and art, or health and fitness. Check through the activity sheets before planning your schedule so you will know what activities best integrate with other subjects.

Focuses on Today's Concerns

With changes in lifestyles and eating patterns over the past fifty years, Americans are more likely to be affected by dietary excesses than by deficiencies.To help children make wise food choices within the context of our modern society, nutrition education must include current nutrition-related health concerns. Consequently, the material in the guides reflects such contemporary issues as the selection of nutritious snacks, the importance of physical activity for fitness, the desirability of limiting dietary intake of fat, sugar, salt, and calories, and the need to reduce the waste of food and food-related resources to protect our environment.

Provides Flexibility

The guides encourage flexibility and creativity in the classroom. They are not a prescription for teaching. Instead, a wide range of possible activities is presented so that you can select and structure learning experiences to meet the needs of your students. You may schedule nutrition education activities throughout the school year or introduce them as units.

Promotes Active Learning

The materials engage students in active learning. Such "hands-on" activities as testing lung capacity, constructing a three-dimensional food tube, creating a mini-landfill, practicing first aid techniques, and probing into food waste habits in the school, home, and community all stimulate learning by directly involving students.

Participating in these activities gives students a chance to think, feel, and act. The activities for grades 4 through 6 foster critical thinking and challenge students to investigate ideas ranging from the mystery of microscopic cells to considering environmental problems concerning energy.

Includes Motivators

Special motivators such as science experiments, puzzles, crafting an apple head doll, improvisations, and tasting new foods entice students to learn about nutrition. These exciting activities will appeal to students on both affective and cognitive levels.

Evaluates Learning

Like other components of the school curriculum, nutrition education must be evaluated to determine whether the desired outcomes have been produced. It is not easy to evaluate whether the goal of promoting behavior that fosters good health has been achieved. How students apply knowledge to nutrition and health-related issues is even more important than their increase in knowledge. Therefore, whenever possible, the evaluation should include ways to measure changes in underlying attitudes and in behavior. To facilitate this evaluation, the teaching materials in the nutrition education guides provide various tools for monitoring students' nutrition learning.

Observation: Observing students in the classroom enables you to evaluate changes in their behavior. For example, are students less likely to throw away nutritious foods during the lunch hour after they have studied food waste? Do individuals gravitate to the science materials and seem curious about exploring them? Are students eager to use their math skills to figure how many Calories are provided by the protein, fat, and carbohydrate in a given food?

Verbal Wrap-Up: Students should summarize in their own words what they learned from a particular lesson. Can they explain the importance of food energy and why too much food energy may be as much of a problem as too little? Can they tell you why exercise might be a key to health? After learning about the chemicals in food can they discuss the pros and cons of using preservatives or artificial sweeteners? Such a wrap-up gives students a sense of accomplishment and helps them remember key points.

Application of Learning: You can ask students to apply their knowledge or skills in new situations. After learning to read labels, they could be asked to evaluate several products and select the food lowest in fat or the cereal with the least sugar. Can they use their class knowledge to plan a bag lunch, a class campout, or snacks for younger children? Do they demonstrate ability to use the apparatus and keep careful records while doing science activities?

Repetition: Repeating certain classroom activities or work sheets will show whether students have changed their attitudes or values about particular issues. After studying food waste, do students indicate any changes in attitude about conservation of food and food-related resources? After participating in the mock congressional hearing activity, are students able to separate facts and opinions about sugar?

Parent Feedback: By participating in conferences, parents can provide additional evaluation information. Do parents report that their children are more conscious of the need for active exercise?

Have the children started to read labels or take more interest in what they eat at meals? After using dental disclosing tablets in class, are the children more careful about brushing their teeth? Are children more conscious of poisons in the home and have they posted the poison control number near the telephone? Have they asked where local landfills are located? Such informal information can help you judge whether the nutrition program had a desirable effect.

Encourages Parent Involvement

New ideas in any subject are always learned better if they are reinforced in the "real world." Home and family are important parts of a child's world. Parents have a strong interest in their children's health and growth, and parents also control what foods are available in the home. By working together, parents and teachers can double their impact on children's eating practices.

You can encourage parents to participate in many different classroom activities. For example, cooking activities and science experiments usually run more smoothly when an extra adult helps. Or a parent with special expertise might talk to the class or demonstrate a skill. Parents can also be invited to attend open houses or special events or to go on class trips.

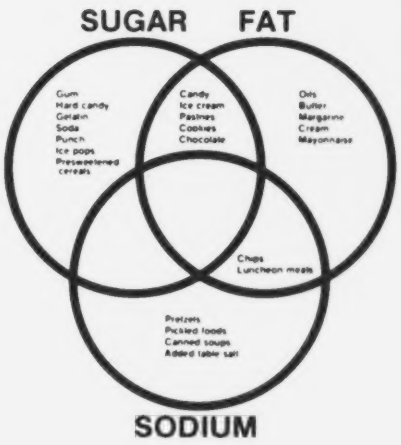
Another way to involve parents is by making a special effort to let them know what is happening in the classroom. You can share information about your class nutrition projects, and students can take home their work sheets, recipes, snack information, and letters that are included in the units.

Encourages Food-Service Involvement

The food-service personnel in your school may assist you with different food-related activities. They may be able to provide ingredients, equipment, utensils, and advice about foods and cooking safety. If you want any special help from food-service personnel, be sure to plan ahead so you can ask them well in advance of the time you need their help.

Ask your food-service staff to give the class a tour of the kitchen, or ask whether a class cooking activity could be done in the kitchen. Be sure to involve your food-service manager in your planning for a food waste study at school so it can be a positive experience for everyone. Cooperation between the classroom and cafeteria can maximize their impact on children's food habits.

Some Key Nutrition Issues



Sugar

Sugars are natural components of some foods. Fruits and some vegetables contain sugars, along with important vitamins, minerals, and fiber. Unlike fruits and vegetables, however, many food products contain large amounts of added sugar (sucrose, dextrose, honey, fructose) and contribute little more than kilocalories. When these "empty-calorie" foods and beverages replace more nutritious choices, getting enough nutrients without too many calories may be a problem. Even the increasing use of artificial sweeteners does not solve the problem of soft drinks replacing a more nutritious choice such as milk. Foods such as sugared milk products, ice cream, custards, and puddings can be considered "good" in moderation because they contain protein and calcium. But eating too many sugary products may contribute to obesity and is a major factor in tooth decay.

Dental Health

Not only are dental problems widespread in the United States, but professional dental care is expensive. Therefore it is important to begin good diet and health habits early in life.

Sugar (sucrose) is the preferred food of cavity-causing oral bacteria. When sugar is available, the bacteria eat it, forming acid. The acid weakens the tooth structure and promotes tooth decay. More critical than the amount of sugar ingested at any one time are the frequency and duration that sugar is available to oral bacteria.

Sugary snacks are of particular concern because they increase the frequency of exposure to sugar and may also increase the duration of exposure. For example, soft drinks that are sipped and sticky candies that adhere to the tooth surface keep sugar available to oral bacteria for extended periods of time, especially if they are eaten as snacks. When sweets are eaten with meals, other foods tend to buffer the acid formed and also assist in removing sugar from the teeth.

Fats

Fats provide kilocalories and essential fatty acids. But only a small amount of dietary fat supplies all the essential fatty acids. A recent concern is that Americans derive too many of their daily kilocalories from fat. Not only may this high fat consumption lead to obesity, but one class of fats appears to be an important factor in heart disease.

Studies have shown that saturated fat, found mainly in animal products, tends to contribute to heart disease, whereas unsaturated fat may not. Cholesterol, a substance found only in animal fat, has been implicated in heart disease. The primary source of unsaturated fat is safflower, sunflower, corn, and soybean oils. Coconut and palm oils contain higher amounts of saturated fats.

In light of these findings, it has been suggested that people decrease the amount of saturated fat they eat. It has been further recommended that Americans decrease their total fat consumption from the present level of about 40 percent of total calories to 30 percent.

Sodium

Hypertension or high blood pressure can be a nutrition-related health problem. Large intakes of sodium, mostly in the form of common table salt, are implicated in causing high blood pressure in susceptible persons. Lowering sodium intake and achieving reasonable weight help control hypertension.

Many advertised snack foods are very high in sodium. Potato chips, salted pretzels, and some crackers are examples of high-sodium foods. It is encouraging that new low-sodium forms of these favorite snacks are now on the market. Canned vegetables without added salt and low-salt cheeses are also now available. Cutting down on sodium is one way to build better food patterns for the future.

Iron-Deficiency Anemia

A recent survey found that 61 percent of children in the United States were receiving less than the recommended dietary allowance for iron. A continual low iron intake increases children's risk of developing iron-deficiency anemia.

Anemia is caused by a lack of dietary iron needed to form hemoglobin, a compound in the blood that carries oxygen to the cells. Symptoms of anemia include fatigue, weakness, irritability, and pallor.

Meat, poultry, dried beans, and dark green vegetables can help meet the iron requirement. In addition, unsweetened fortified cereals, whole-grain and enriched breads, and dried fruits are iron-rich foods that make appealing snacks. Because vitamin C increases the absorption of iron, citrus fruits and juices are good companions to high-iron meals and snacks.

Calcium Concern

Bone health is a key concern of both youth and adults. Interest has always focused on supplying necessary calcium and vitamin D for the formation of bone in growing infants and children. Increasing concern about osteoporosis has caused us to search out information about maintaining bone health during our mature years.

Our bones are in a state of constant flux, serving as banks in which calcium can be deposited and withdrawn. Although 99 percent of the body's calcium is in the bone, the other 1 percent circulates in the blood and is vitally important for normal nerve transmission, muscle contraction, heart function, and blood clotting. When this small but critical amount falls below a certain concentration, the bones release some of their calcium.

Low intake of calcium-rich foods during the adult years compromises bone health. Adults need calcium just as much as growing children do. Prolonged deficiency of calcium through the adult years may increase the risk of osteoporosis, a disease seen particularly in postmenopausal women and characterized by weak and fragile bones.

Since bone mass reaches its maximum when a person is about the age of 35 and declines as part of the aging process thereafter, people of all ages need to be aware of their intake of milk and such other sources of calcium as leafy green vegetables, broccoli, and fish with edible bones such as sardines, canned salmon, and fresh smelt.

Because calcium is important throughout life, students should establish habits of calcium consumption that they will follow throughout their lives.

Obesity

Obesity is a major health problem in the United States today, for both adults and children. Why is excessive weight a health concern? In adults, the prevalence of diabetes, hypertension (high blood pressure), and atherosclerosis (heart disease) increases with obesity. The concern for children is that obesity will persist into adulthood and result in health problems. Overweight or obese children also may be troubled by emotional and social problems.

What can be done? All children can be encouraged to be very active all year round. Extra attention should be paid to children with weight problems, to be sure that they find an activity they can do and enjoy—and that they continue to do it. Parents and children should learn about the problems of overeating. Good habits can be developed early. Many families are concerned about wasting food at the dinner table. Food waste, however, starts in purchasing and preparation. A good eater is a moderate eater, not a big eater.

Energy Balance

Kilocalories (energy) are needed to support life and growth. Eating too few kilocalories can result in poor health and, in children, can limit growth. Eating more kilocalories than required, however, can also result in poor health. Overweight, and especially obesity, can increase the risk of developing many health problems. The number of kilocalories that a person needs for health depends on the amount of energy that he or she uses for basic body processes and for physical activity.

Carbohydrates, proteins, fats, and alcohol are the food components that give us kilocalories. Carbohydrates, proteins, and fats are essential nutrients; alcohol is not. But there are other essential nutrients that we must eat to be healthy: minerals, vitamins, and water. Although these nutrients do not supply kilocalories, they can be found in many foods that do. Each class of nutrients is important for a variety of body functions. Therefore, the foods in our daily diet must be carefully selected to supply all the essential nutrients without exceeding our kilocalorie requirements.

Energy = **Kilocalories**

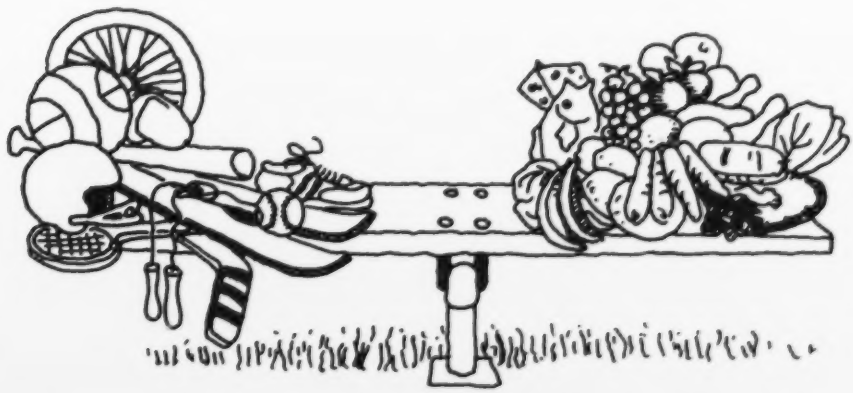
Kilocalories = **Calories**

The energy value of a food is expressed as a unit of heat. A kilocalorie (kcal) is the amount of heat required to raise the temperature of one kilogram of water one degree Celsius. Another way to think of this amount of energy or heat is to realize that one large apple, which contains about 100 kcal, provides enough heat to raise the temperature of slightly over four cups of water from 0 degrees C (freezing) to 100 degrees C (boiling). Four and a half cups of shredded cabbage or one tablespoon of peanut butter has a similar energy potential.

Kilocalorie (kcal) is the unit of energy we should use when we talk about the energy value of food. A kilocalorie is 1000 calories. The term *calorie* is often mistakenly used to represent the energy value of foods, but kilocalorie is the correct scientific term. For example, a glass of whole milk contains 165,000 calories. We omit the zeros and use the word *kilocalories,* with the understanding that *kilo* stands for those zeros. Another way to indicate kilocalories is to use *Calories* spelled with a capital *C.* Thus, one glass of milk has 165 kilocalories or 165 Calories. In Levels 4 to 6 of **Nutrition Comes Alive** the energy values of foods and activities are expressed as Calories rather than kilocalories.

Snacks—A Nutritional Plus or Minus?

Many people tend to think of between-meal snacks as "junk" or "empty-Calorie" food, but it is not necessarily true. The problem is that candies, soft drinks, cookies, and potato chips are often eaten exclusively for snacks in place of nutritious foods. These foods offer few nutrients but are loaded with Calories. By learning to choose snacks carefully, children can avoid overly sweet or salty and high-fat snacks in favor of more nutritious fruits, vegetables, grain products, and milk. Well-chosen snacks can make a substantial contribution to the nutritional quality of children's diets.



Fiber

The dietary fiber in our diets is not just one compound but a grouping of many complex carbohydrates found in cell walls of plants. These include cellulose, hemicellulose, and pectins as well as lignin, which is not a carbohydrate. In simple terms, dietary fiber refers to polymeric components of plant cells that your body does not digest and absorb.

Most nutritionists agree that dietary fiber is very important, but many of the benefits that have been claimed have not been proved. At the present time, the most clearly established benefit of dietary fiber is that it helps to relieve or prevent constipation. There is evidence that it is beneficial in preventing or treating diverticular disease. It has also been suggested that fiber may reduce the risk of cancer of the colon and heart disease and help control diabetes and obesity. Some of the effects may be indirect in that a diet higher in fiber will contain less fat and protein.

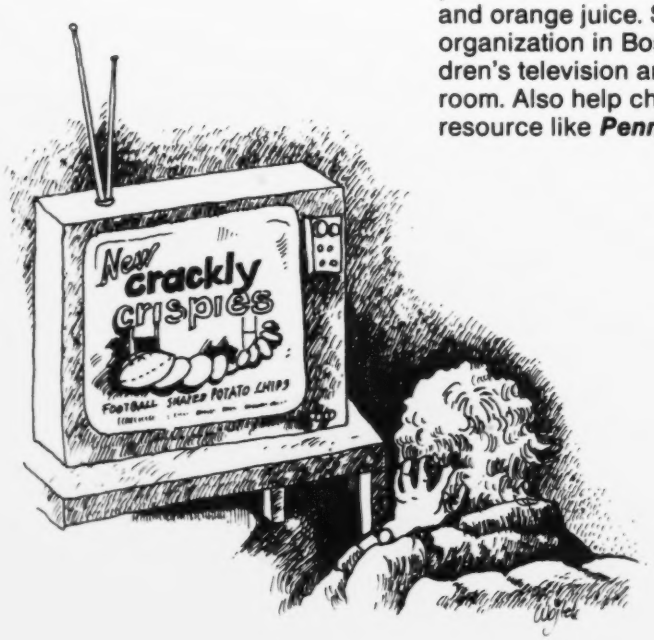
But although fiber is important in the diet, just because some is good, a lot is not necessarily better. Large doses of purified fiber may increase the excretion of some minerals, but it is unlikely that a mineral deficiency will develop if moderate amounts of fiber are eaten as part of a normal diet.

The best advice is to increase dietary fiber by eating more fresh fruits and vegetables, whole-grain bread and cereal products, beans, and nuts. With this approach you are not likely to consume excess fiber and you will get a variety of types of fiber, each of which might have a different benefit. In addition, these foods supply vitamins and minerals.

Children and Food Advertisements

Every day we are bombarded by food ads through newspapers, magazines, direct-mail ads, radio, and, of course, television. Children watch an average of 27.5 hours of television per week and more than 20,000 commercials per year. It has been estimated that 60 percent of all commercials aimed at children are for food, and, unfortunately, the majority are for nonnutritious foods and food products. With this exposure, the food ads undoubtedly have a tremendous impact on the way children think about food. It is not a simple problem to deal with, but with guidance from parents and teachers, children can learn to question what they see on television and become aware of the selling intent of ads.

Repeated positive advertising is needed to complement nutrition education. Encourage local TV affiliates to increase their use of paid and public service announcements that support healthy foods such as milk and orange juice. Support the Action for Children's Television (ACT) organization in Boston, Massachusetts, in its effort to improve children's television and consider using ACT teaching tools in the classroom. Also help children to become wise consumers by using a good resource like ***Penny Power*** magazine.



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Nutrition Educator's Guide

Objective for Level 4

Students will explore how to balance food intake and energy output for overall health and physical fitness.

Using *The Great Balancing Act*

Promoting Increased Physical Activity

Results of the ***National Children and Youth Fitness Study*** show that nearly 50 percent of all American children are physically unfit. One reason may be that too many children rely on cars or other vehicles for transportation instead of walking. Another explanation might be the increasing popularity of sedentary activities such as watching TV and working on a computer.

If children are to develop into healthy adults, they must be inspired to adopt a more active lifestyle. You can do your part to promote positive attitudes about fitness and physical activity by

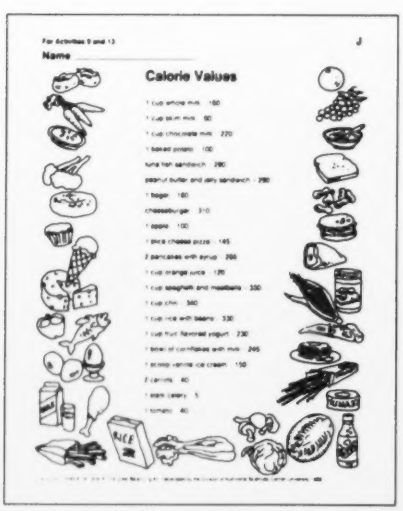
- scheduling exercise breaks between lessons.
- tape-recording popular music and playing it during exercise time. Your students might enjoy bringing their own tapes.
- setting up a "Focus on Fitness" corner in your classroom to display stories and photographs that describe different students' or professional athletes' fitness regimens.
- displaying posters with fitness or exercise themes.
- adopting an enthusiastic attitude about fitness and exercise yourself. Set an example of a healthy, active lifestyle for your students.

Nutrition Educator's Guide

The Great Balancing Act contains three sections of proposed class activities. The understanding for each section is listed on the section divider.

- Section 1 establishes that energy is needed for all life processes.
- Section 2 examines the relationship between intake and expenditure of food energy.
- Section 3 focuses on how technological changes have affected personal energy expenditure.

To help you plan for each lesson, a section at the top of each activity sheet gives instructions for advance preparation. Work sheets that should be copied for that lesson's activities are listed as well as books to borrow, food ingredients to assemble, and films to order.


Name _____

Calorie Values

Integration

Each of the nutrition activities may be integrated into other academic subject areas as noted in the upper right-hand corner of each activity sheet. Activities were coordinated with the fourth grade curriculum of New York State.

Student Work Sheets

A separate booklet contains work sheets that you may photocopy or make into dittos for distribution to the class. Suggestions for using these work sheets are found in the activity sheets in the ***Nutrition Educator's Guide.***

Letters to Parents

To help involve parents in their children's learning, ***The Great Balancing Act*** includes two letters that can be copied and sent home with the children. These letters provide parents with nutrition information and suggest activities they can do with their children to complement the activities taking place in the classroom.

Improvisations

Several activities in this unit include improvisations to provide your students with a unique and imaginative framework for exploring energy and energy balance. Improvisational drama encourages students to act out or recreate an event or situation. Successful improvisations do

not require extensive props, rehearsals, or costumes. They involve all students and can be easily integrated into many classroom activities and learning situations.

The benefits of improvisational drama extend beyond providing knowledge of facts and events. Improvisations free students from memorizing prepared scripts, thereby allowing them to exercise their creativity and ingenuity. Improvisational acting also helps promote self-confidence and self-esteem.

Directions on how to incorporate improvisational drama in your classroom are included in Appendix 3. Specific improvisational scenes are suggested in each section of ***The Great Balancing Act.***

Resources

Books, films, and any additional enrichment resources needed for a particular activity are noted in the advance preparation sections of the activity sheets. More complete information about the resources is listed on the back of the appropriate section dividers.

Evaluation

Each section contains a final activity sheet with suggestions to help you evaluate student learning. It is vital that students be able to verbalize and demonstrate what they have learned.

General Resources

Nutrition Education Programs

Creative Food Experiences for Children. M. T. Goodwin and G. Pollen. 1974. Available from CSPI, 1755 S St. NW, Washington, DC 20009.

This excellent teaching guide includes basic nutrition concepts, nutritional values of different foods, and nutrition activities, resource materials, and recipes.

From the Inside Out: A Kid's Guide to Food and Physical Fitness. C. Bershad and D. Bernick. 1979. Available from Learning for Life, Management Sciences for Health, Department CU2, 165 Annandale Road, Boston, MA 02130.

This book is an excellent resource for teaching the principles of physical fitness and nutrition to children. It contains information on basic nutrition concepts, fitness, anatomy, and food choices. Topics are presented in an exciting, easy-to-read format and accompanied by engaging illustrations. The text is written with "kid appeal."

Teaching the 3 R's through Movement Experiences. A. Gilbert. New York: Burgess Publishing, 1977.

Be a clock, do a syllable dance, describe how clouds are formed—these are just three out of dozens of creative movement lesson plans described in this delightful teacher's handbook. It will serve not only as an excellent accompaniment to a fitness unit but as a valuable year-long resource for introducing activity in all classroom lessons.

Food Education Resources

New York Agriculture in the Classroom. Developed by the Department of Education, Cornell University, 1986.

In the fall of 1987 the **New York Agriculture in the Classroom** program will have curriculum materials to teach required subject matter using accurate agricultural examples. Production, processing, distribution, and retailing of food and fiber will be the focus of units in science, social studies, mathematics, and language arts. Contact your county Cornell Cooperative Extension 4-H program for information.

Cookbooks for Children

A Child's Cookbook. B. Beitch, T. Arms, T. Wallace, and G. Wallace. 1981. Available from 656 Terra California Drive #3, Walnut Creek, CA 94595.

The kit includes a cookbook and teachers' guide. Illustrated single-portion recipes for home and school are provided in an easy-to-use format. Many ethnic recipes are included.

Pictures of Foods

The Buying Guide for Fresh Fruits, Vegetables, Herbs, and Nuts. Educational Department, Blue Goose, Inc., P.O. Box 46, Fullerton, CA 92632.

An excellent source of color photographs of fruits and vegetables

Food Models. National Dairy Council. See Appendix 2 for a listing of local Dairy Council offices.

Life-size color photographs of 146 foods can be used in a variety of teaching situations. Nutrient values and their contribution to the U.S. RDA are printed on the back of each model.

Basic Nutrition Information

Nutrition: Concepts and Controversies. E. M. Hamilton, E. N. Whitney, and F. S. Sizer. 3d ed. St. Paul, MN: West, 1985.

This introductory textbook presents basic nutrition concepts and current issues in an easy-to-read, personal style. Many informative tables, charts, and drawings are included within each chapter. Each chapter concludes with an in-depth discussion of a controversial issue such as diet and heart disease, diets for athletes, and the effect of sugar on behavior of children. An extensive appendix includes a table of food composition and many additional facts.

Jane Brody's Nutrition Book. J. Brody. New York: Bantam Books, 1982.

Written for the general public, this book provides information on a number of current issues in nutrition. The dietary guidelines, cholesterol, fiber, sugar, food additives, food labels, sodium, fat diets, and fast-food eating are among the many topics discussed in 27 chapters.

The Athlete's Kitchen. N. Clark. New York: Bantam Books, 1981.

Nutrition and exercise information is especially geared for an athlete or would-be athlete but also practical for anyone interested in making healthy changes in diet and lifestyle. The writing style is delightful and down-to-earth.

Nutrition, Weight Control, and Exercise. F. I. Katch and D. McArdle. Philadelphia: Lea & Febiger, 1983.

Sound information is presented regarding the "whys" and "hows" of the multidimensional aspects of fitness, nutrition, and weight control. Three sections cover general nutrition/energy concepts, body composition and weight control, and conditioning for total fitness. Appendixes give the nutritive value of many foods and energy expended for a variety of activities.

Film, Computer Program, and Slides

High Feather. Albany: New York State Education Department, 1980. Available through Great Plains National Instructional TV Library, P.O. Box 80669, Lincoln, NB 68501, or from your local BOCES office.

Ten dramatic programs are aimed at altering the eating patterns of youth ages six to twelve. Filmed at a summer camp, ***High Feather,*** which means good health, focuses on the adventures of eight children as they learn about nutrition and health.

New York Learning about Eating, Activity and Nutrition (NYLEAN). M. Mapes and M. Brink. Ithaca: Division of Nutritional Sciences, 1985. Available from Division of Nutritional Sciences, Cornell University, Ithaca, NY 14853.

NYLEAN is an educational computer program for use with the IBM PC. It is designed to help individuals understand the relationship between food intake, physical activity, and body weight (energy balance).

Energy: Our Food and Our Needs. Produced by Susan Travis and Barbara Fry. Revised by Susan Travis. 1984. Division of Nutritional Sciences, Cornell University. Available for sale or rent from Cornell University Audio-Visual Center, 8 Research Park, Ithaca, NY 14850.

This three-part Cornell Cooperative Extension slide set covers foods high in energy nutrients; use of carbohydrates, fat, and protein within the body; individual energy needs; effects of imbalanced intakes of carbohydrates, fat, and protein; practical application of dietary guidelines; and a reminder that alcohol provides calories but no nutrients.

Nutrition Education Specialists

Cornell Cooperative Extension. Addresses of local offices are listed in Appendix 1.

Adult and 4-H agents, serving as professional home economists at the county level, are part of Cornell Cooperative Extension statewide and work closely with faculty and staff in the Division of Nutritional Sciences at Cornell University to promote nutrition and health.

Youth programming includes a large 4-H youth development effort, a part of which is work with teachers in the schools. **Nutrition Comes Alive,** K–6, and **Make Up Your Mind about Alcohol,** 5–6, are two special nutrition resources developed by Cornell Cooperative Extension for school use.

Consult your local Cornell Cooperative Extension office for details about workshops and current resources.

National Dairy Council. Addresses of local offices in New York State are listed in Appendix 2.

The National Dairy Council offers extensive and excellent nutrition education resources for the classroom. Reference to its annual catalog will help you select appropriate resources to match the ability levels of your students.

New York State Education Department. Bureau of Health and Drug Education and Services.

The Nutrition Education and Training Program (NET) is currently organized into three regions in New York State. Services under NET include assistance in the development of nutrition education programs and services; training workshops for administrators, teachers, and school food service staff; and development and distribution of nutrition resource materials. Addresses of regional offices are listed in Appendix 2.

Note: Specific resources needed for activities in each section are listed on the back of the appropriate section dividers. You may need to order films well in advance of when they are needed.

Section 1

The Great Balancing Act

Energy: That Mysterious Force in and around You

Understanding:

Energy is needed for all life processes.

Before You Start

All living things need food energy to carry on their life's work. Plants use sunlight to create their own food energy internally. Animals and humans must consume living (or formerly living) things for their energy. The energy they obtain from food is measured in units called Calories or kilocalories. Nonliving things such as machines also use energy. Except for nuclear energy, all energy, no matter who or what uses or stores it, comes initially from the sun.

Activities in this section focus on the different amounts of Calories in foods contributed by the three nutrients that provide energy—carbohydrate, fat, and protein. The activities set the stage for learning in Sections 2 and 3 about how to use exercise to manipulate Calories ingested and Calories expended to achieve energy balance.

Activities	Subjects
1. Energy Go Power	Science
2. Create a Human Machine	Language Arts
3. Energy Examinations	Science
4. Calorie Countdowns	Math
5. Concentrate on Calories	Science
6. Adding It All Up	Math
7. Evaluation	Language Arts

Resources

Energy. I. Podendorf. Chicago: Childrens Press, 1982.
This book provides information on how people obtain and use many forms of energy. Excellent color photographs accompany the easy-to-read text.

More Power to You: A Short History of Power from the Windmill to the Atom. H. and N. Schnieder. New York: William R. Scott, 1972.
A detailed account is provided of how sources of power have changed with developing technology. Experiments that are easy to do and models that are simple to build help students better understand the power of wind, water, steam, gasoline, electricity, and atoms.

Solar Energy at Work. D. Peterson. Chicago: Childrens Press, 1985.
Striking color photographs enhance a concise but thorough text. Ideas for experiments and a glossary of important scientific terms are included. The different uses of solar energy are explained.

Nutritive Value of Foods. Home and Garden Bulletin 72, U.S. Department of Agriculture. Available from Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402. Revised 1985.
This bulletin contains nutritive values of commonly used foods: fat, fatty acids, cholesterol, carbohydrates, calcium, phosphorus, iron, potassium, vitamin A, thiamin, riboflavin, niacin, ascorbic acid, and sodium.

"Energy" and Other Tricky Nutrition Words. Available from the United Fresh Fruit and Vegetable Association, 1019 Nineteenth Street NW, Washington, DC 20036.
Many nutrition vocabulary words are explained in a humorous, light-hearted manner. Request a free catalog of United's other publications.

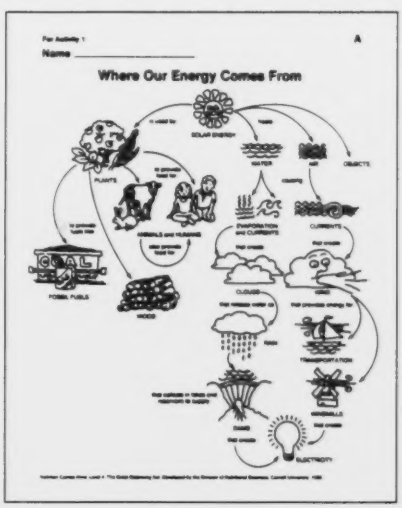
Energy Go Power

Advance Preparation

Obtain one or more of the following books: ***Energy, More Power to You, Solar Energy at Work*** (Resources, Section 1) or refer to a science text for a discussion of energy.

Collect magazines and sheets of construction paper in assorted colors.

Copy information sheet A for each student.



Investigating Energy

Have students look around the classroom, school, or playground for machines, people, and animals that use energy. Make two columns on the blackboard titled "Energy User" and "Energy Source," as shown in the diagram, and write their ideas under the appropriate headings.

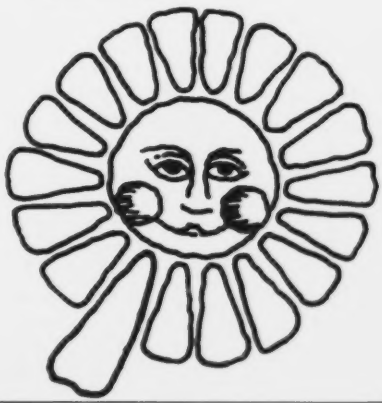
Questions for conversation:

—Can you see, feel, or touch energy?
(Energy itself is invisible, but you can observe the changes that occur as energy is used. When a car's engine burns gasoline, you see the car move; when wood is burned, you feel heat and see flames; when electricity is turned on, appliances work and lights shine; when people eat food, they grow, play, and have energy to do other activities.)

Burning a food provides a dramatic illustration of the concept that food contains energy. For best results, use a Triscuit cracker. It contains oil, and its open weave allows air to circulate and facilitate burning. Hold the Triscuit with tweezers or forceps and light it with a match. Another option would be to place the burning cracker under a beaker of water containing a thermometer so students can record the temperature change of the water.

—How is your personal energy source different from those of machines, plants, or other animals?
(Plants can make their own food energy internally. People and animals cannot make food inside their bodies so they obtain energy by eating plants or other animals. People and animals do not all eat the same plants and animals. Machines get their energy from fuels like electricity, coal, or gasoline.)

—Where do energy sources like electricity or gasoline get their energy?
(Electricity: generator—moving water—sun. Gasoline: decayed plants—sun. Milk: cows—plants—sun.)



Energy User	Energy Source
Car	Gasoline
Fan	Electricity
Squirrel	Nuts, berries
Flashlight	Batteries
Bird	Worms, seeds
Light bulb	Electricity
Oven	Electricity or gas
People	Food
Plant	Sun

Find the Source

Information sheet A, "Where Our Energy Comes From," shows many other forms of energy that are generated from the sun's energy. Distribute copies of information sheet A to each student. Review the flow chart and discuss the sun as the main source of the earth's energy. Only nuclear energy is not derived from the sun.

(continued)

The sun's rays cause air and water to move, creating wind and water power that can turn windmills and power generators. The sun provides energy that can be used to heat houses and run machines. The sun also provides plants with energy to grow and live. Animals and people eat plants and other animals to supply the energy *they* need to grow and live. Decayed and decomposed plants from millions of years ago supply fuels like gas, oil, and coal for machines and engines today.

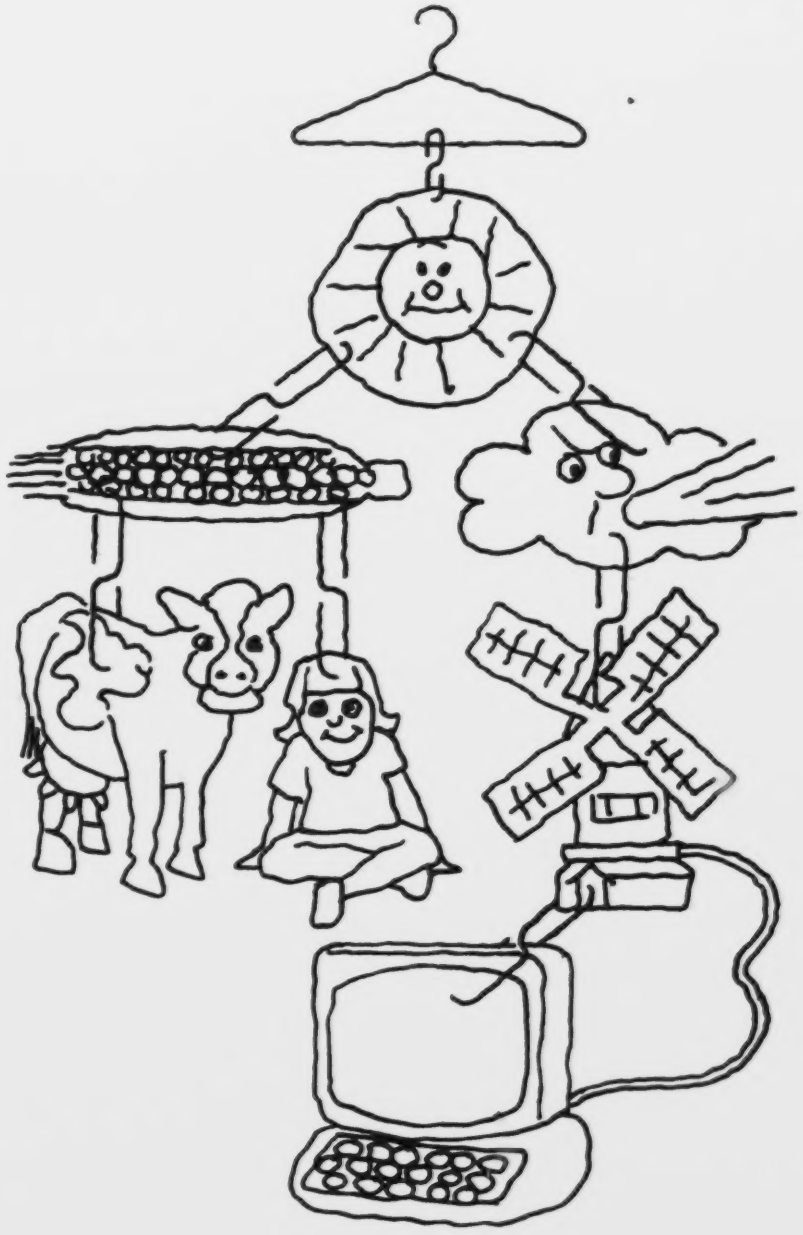
Trace an Energy Path

Have the students identify as many energy sources as possible, tracing them all back to the sun as the ultimate source of energy. List these sources in a chart on a bulletin board using the headings "Food," "Solar Heat," "Wind and Water Power," and "Fuels." Have the students draw or cut out pictures from magazines to attach to the chart to illustrate the energy sources.

Additional Activity

Energy Sources Mobile

Have students draw and cut out pictures from construction paper to represent all the energy sources for two or three items in the Energy User category. Using wire hangers and paper clips, have them create a mobile that represents the energy paths of the different items they chose. Each student should cut a "sun" out of heavy oak tag to support all the other pictures on the mobile.



Create a Human Machine

Advance Preparation

Review information on improvisations (see Appendix 3).

Obtain books that describe various machines and how to operate them, or bring in some machines from home (optional).

Acting Out Machines in Motion*

Ask students to name and describe machines they have seen in operation, such as clocks, record players, escalators, typewriters, sewing machines, and mixers. You may want to bring in some examples. Talk about the moving parts of each one: what they do, how they move, and how the parts relate to one another. Point out that each part makes the same movement and sound over and over unless its speed or energy source is adjusted. Compare a machine's moving parts with human parts like arms, legs, hands, and mouth.

Tell the students that they are going to construct a huge machine, and they will be the parts. You may want to have them work out two-person machines first to familiarize them with the process.

To create the large machine, have one person act out a sound and motion in an open space in the classroom. Add other students until they have formed a seven-part machine. Make sure each person retains his or her own movements and sound.

The students might decide that their machine should function as a huge generator that will provide the power for the entire classroom.

After the machine is going at full speed, other students can pretend to pull out its plugs one by one, while others could turn off lights and other electrical devices to show the effects of the generator slowing down. The machine's motions should also reflect the decrease in energy. Have students compare the slowing of the machine to their bodies' reaction to a shortage of food energy. The following are some examples:

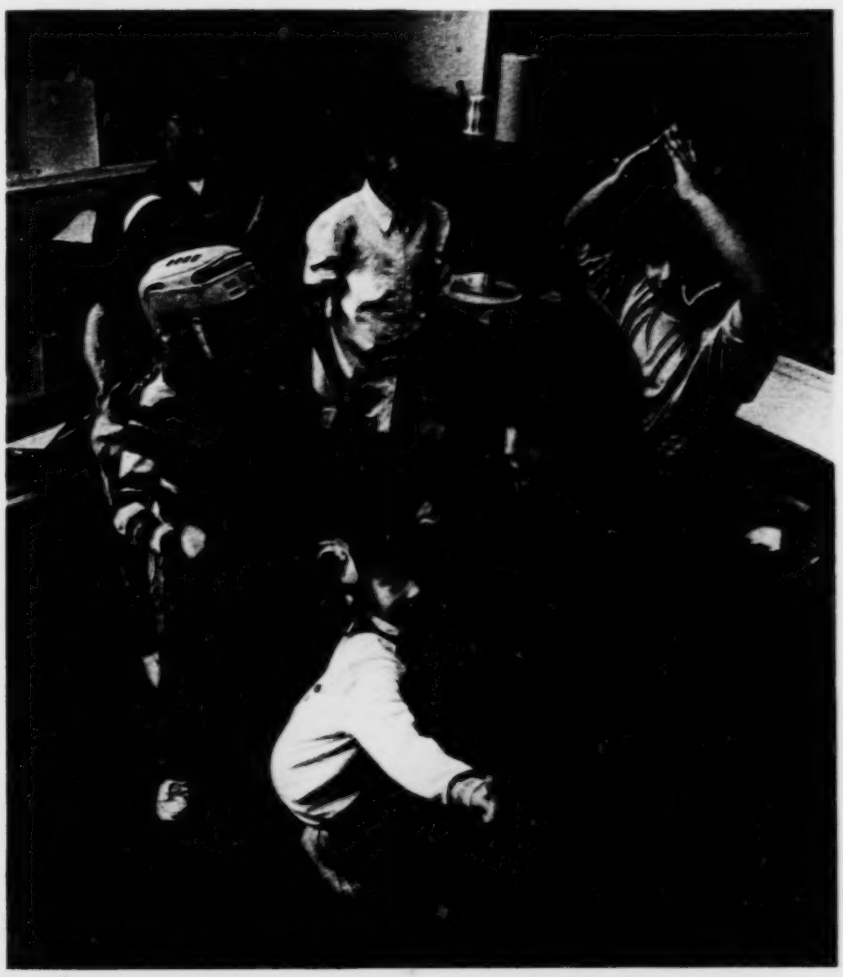
—Feeling tired and hungry

—Not having enough energy to play or do other activities

—Not growing if the energy shortage lasted a long time

Emphasize that if it lacks adequate food energy, the human machine does not run properly.

(continued)



*This activity was contributed by Ruth Davis, Supervisor, Center for the Expressive Arts, Ithaca Youth Bureau, Ithaca, New York.

Additional Activity

Effects of Malnutrition

Investigate the plight of children in underdeveloped countries who are suffering from extreme protein-Calorie malnutrition. Many pictures of such children have appeared on TV news programs and in magazines and newspapers. Talk about effects of a lack of sufficient protein and energy on these children's bodies. Discuss how the children seem to feel, look, and act. Reinforce that all humans need adequate food energy to keep their bodies functioning properly. In Sections 2 and 3, students will learn about the effects of excess food energy on their bodies and why this too is undesirable.

Energy Exam-inations

Food	Spot	No Spot
Apple		
Cheese		

Advance Preparation

Collect

Small amounts of bread, cheese, apple, cracker, potato chips, carrot, walnut, macaroni, and cooking oil.

A box of toothpicks (or cotton swabs) and several brown paper towels or bags cut into 3" x 4" squares.

Two eyedroppers, a vial of iodine, and brown paper towels or newspaper.

Key Words

Nutrients, fat, carbohydrate, protein, vitamins, minerals

Where Is the Energy?

People get their energy from the foods they eat. Six nutrients are vital to health: vitamins, minerals, water, fat, carbohydrate, and protein. Although you can't always see them in the foods you eat, these nutrients help keep the human body running smoothly. Only three nutrients, however—fat, carbohydrate, and protein—provide the energy we need to live, move, and grow. Protein is used primarily for growth and repair, so our bodies rely on fat and carbohydrate as their main sources of energy.

Focus on Fat

Divide the class into four groups of six or seven students. Two groups will do a test to determine whether food samples contain fat. The other two groups will test food samples for carbohydrate.

Have two groups set up experimental work stations to determine whether the food samples you have provided contain fat. First, they should label a sheet of paper to record their findings, as shown in the diagram. Then have each student label paper squares with the names of the foods to be tested. Tell them to take turns dipping a toothpick or cotton swab in cooking oil and touching it to the square of brown paper or paper toweling labeled "cooking oil." After waiting two or three minutes tell them to hold the paper up to a light and observe and record the results. Have students test the remaining food samples by rubbing each one on the paper square labeled with the name of the food. They need to let the paper dry before recording the results because water will evaporate but fat will leave a spot. Explain that food stains on clothing are usually fat spots.

Ask students to think of other foods that might also leave a fat spot. Here are some suggestions:

—Foods with visible fat as on meat or chicken skin

—Foods that are almost all fat such as margarine, butter, shortening, and mayonnaise

—Foods that taste or feel greasy such as cookies, deep-fried foods, and many fast-food restaurant items

Although many high-fat foods are easy to identify, the fat content of some other foods is hidden. Foods with hidden fat include whole milk, whole milk products, luncheon meats, and many highly processed snack foods and desserts.

Find the Carbohydrate

Have the two remaining groups set up experimental work stations to examine food samples for the presence of starch. Explain that starch is one form of carbohydrate. Have them label a sheet of paper to record their findings, as indicated in the diagram.

(continued)

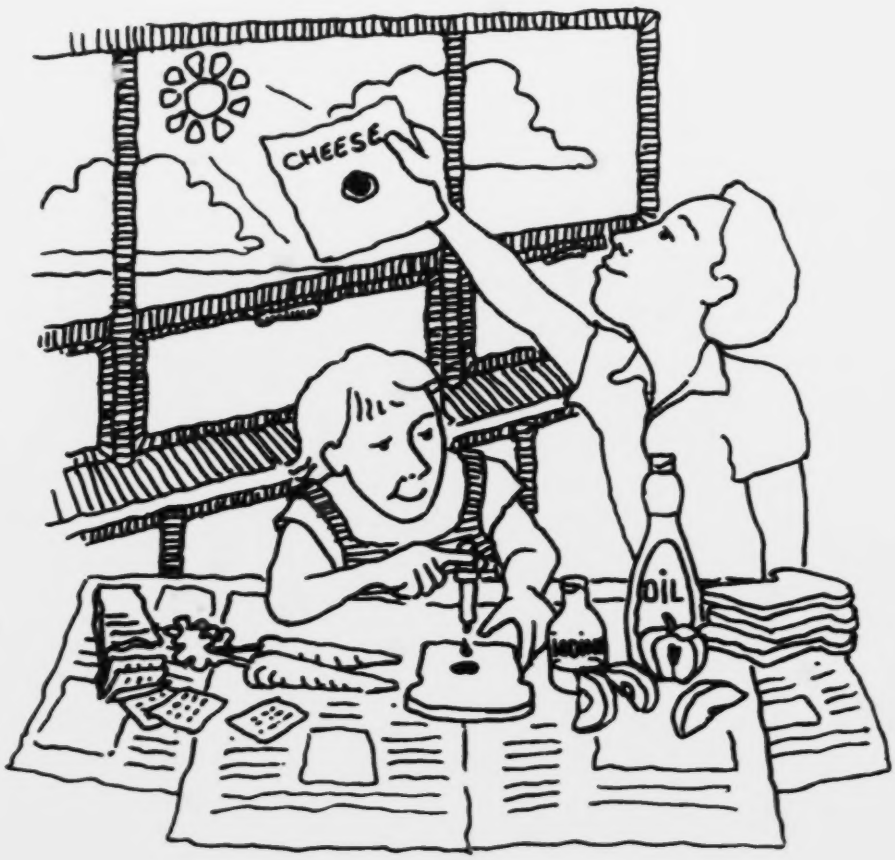
Food	Changed Color	No Color Change
Cracker		
Walnut half		

Explain that iodine is a chemical that tests for the presence of starch in foods. If starch is present, the iodine changes from red-brown to blue-black. Stress that they must work carefully because iodine is a poison and it can stain hands and clothing. Have them place two drops of iodine on each food sample and record the results. Emphasize that the greater the color change, the more starch is present.

Have students think of other foods that might yield positive results when tested with iodine. Breads, cereals, macaroni products, and foods made with flour are high in starch. Pizza crust, muffins, waffles, spaghetti, oatmeal, and cornbread are all possible answers.

Sugar (sucrose) is another form of carbohydrate. The iodine test does not work for this form of carbohydrate. Ask students to name foods that contain sugar. They may think of sweets, soda, and candy. Tell them that fruits also contain sugar in the form of fructose. Both fructose and sucrose (table sugar) are carbohydrates.

Have students from the different experimental groups share their results with the entire class.



Calorie Count-downs

Advance Preparation

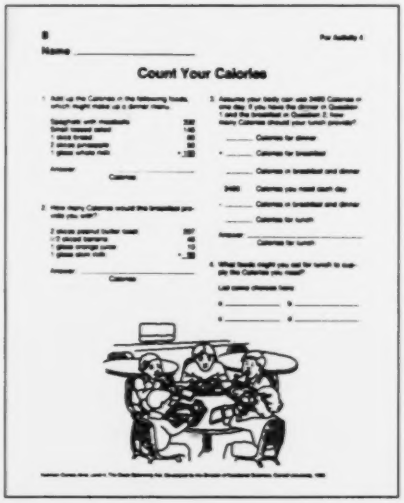
Collect single portions of foods students might eat for lunch such as a muffin, salad, apple, sandwich, hamburger, pizza, and milk. Use items served in the cafeteria or foods students bring with them to school. Food pictures from magazines or models from the National Dairy Council (Resources, Section 1) could be substituted for real food.

Obtain

A book of plain stickers or labels, allowing about 10 per student, and a sheet of newsprint or construction paper for each student.

A copy of ***Nutritive Value of Foods*** (General Resources) or any other reliable Calorie chart.

Copy work sheet B for each student.


Name _____

Count Your Calories

1. Add up the Calories in the following foods which might make up a dinner menu.

Spaghetti with meatballs 320
Small tossed salad 70
1 slice bread 60
1 serving pineapple 80
1 glass whole milk 160

Answer _____ Calories

2. How many Calories would the breakfast you ate have?

2 slices peanut butter toast 360
1 glass orange juice 120
1 glass skim milk 90

Answer _____ Calories

3. Assume your body can use 2400 Calories in one day. If you have the dinner in Question 1 and the breakfast in Question 2, how many Calories should your lunch provide?

_____ Calories for dinner
+ _____ Calories for breakfast
_____ Calories in breakfast and dinner
2400 Calories you need each day
- _____ Calories in breakfast and dinner
_____ Calories for lunch

Answer _____ Calories for lunch

4. What foods might you eat for lunch to use the Calories you need?

List some choices here:

a. _____ b. _____
c. _____ d. _____

Will the Real Calorie Please Stand Up!

We measure time in minutes, height in meters, speed in miles, and the energy in food in Calories.

One Calorie (or kilocalorie) = the amount of heat energy needed to raise the temperature of *one kilogram* of water one degree Celsius.

One calorie = the amount of heat energy needed to raise the temperature of *one gram* of water one degree Celsius.

Kilocalorie is the unit of energy we should be using when we say calorie. A kilocalorie is 1000 calories. The term *calorie* is often mistakenly used to represent the energy value of foods, but *kilocalorie* is the correct scientific term. Calorie with a capital C is an accepted alternative for kilocalorie and is used throughout this book when referring to the energy values of food and energy. For example, a glass of whole milk contains 165,000 calories. We always remove the zeros and say 165 kilocalories, with the understanding that kilocalories stands for those zeros. Another word for kilocalories is Calories. In this unit, the energy values of foods and activities will be written as Calories rather than kilocalories.

(continued)

Stuck on Lunch

Tell the students that they are going to check their Calorie consciousness by finding out how many Calories they eat for lunch.

Set out food samples or pictures for the class to observe. Have students list foods they might choose to eat for lunch and indicate the size of servings or number of portions they would eat.

Have students "guesstimate" the number of Calories in each of their chosen foods and then look up the actual values in ***Nutritive Value of Foods*** or another reference book that provides the Calorie value of foods.

After they have added up the total Calorie value of their lunches, have them take ten stickers and number them by tens from 10 to 100. Have students draw an outline of their upper body on a sheet of newsprint or piece of construction paper and put enough stickers on the paper body to represent the approximate total number of Calories their lunches contained. These pictures could be displayed in the classroom so students can compare their Calorie totals. Alternatively, students could place the stickers on their own bodies.

Discuss possible reasons why some people eat more or fewer Calories than others, such as differences in

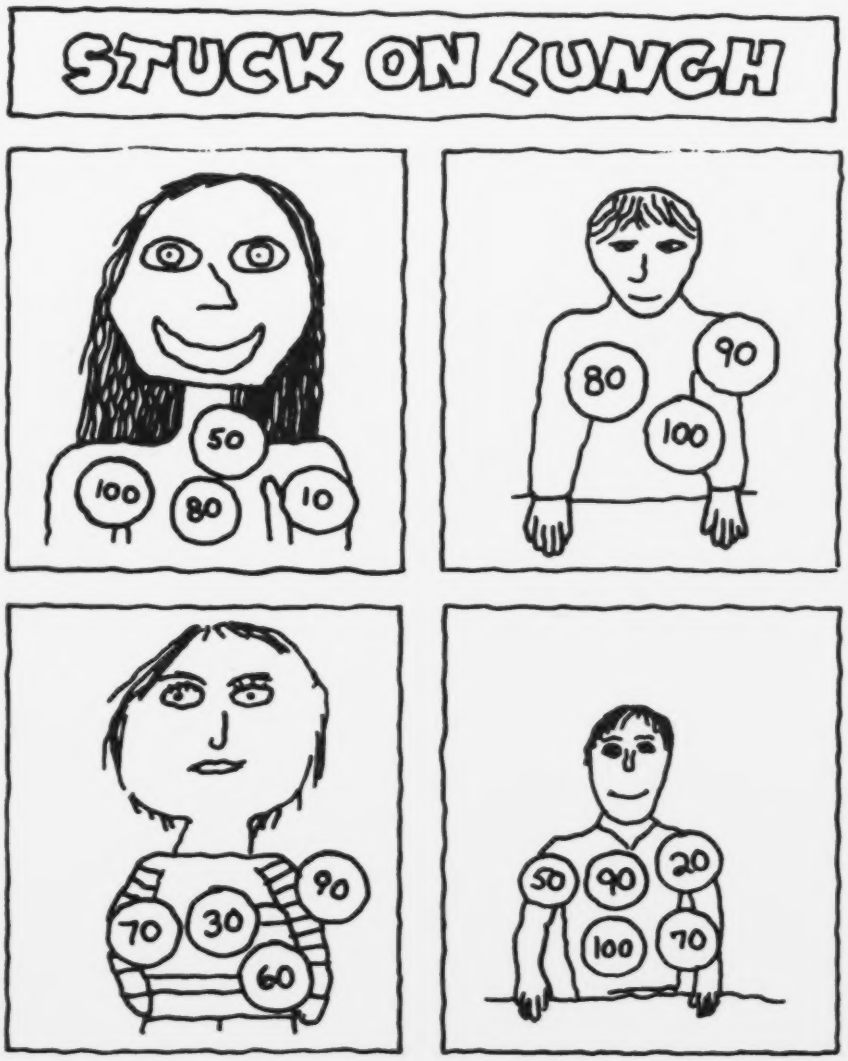
—levels of activity

—food preferences

—eating patterns

Counting Calories

Distribute copies of work sheet B and have students complete the problems by adding up the Calories for each sample meal and answering the related questions.



Concentrate on Calories

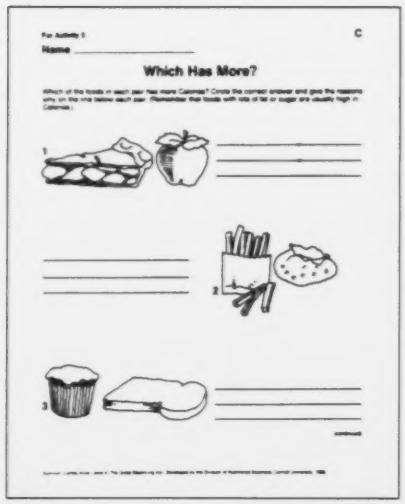
Advance Preparation

Obtain

Nutritive Value of Foods (Resources, Section 1) or another Calorie chart.

A roll of masking tape.

Copy work sheet C and letter D to parents for each student.



Energy Circles

The energy in fat is more than twice as concentrated as the energy in carbohydrate and protein. Use the following simple exercise to illustrate the concept of concentrated energy.

Fat = **9** Calories/gram
Carbohydrate = **4** Calories/gram
Protein = **4** Calories/gram

Using chalk or masking tape, outline three circles approximately four feet in diameter in an open area of the classroom or outdoors. Label the circles with letters corresponding to the three energy nutrients.

The circles should be nearly identical and each will represent one gram of weight. (Two dimes weigh about one gram.)

Tell the students they are going to be Calories. Have four students stand in each of the circles that represent carbohydrate and protein and nine in the circle that represents fat.

Questions to discuss while everyone is in the circles:

—How would you describe the situation in your circle?
(Crowded, comfortable, lots of room.)

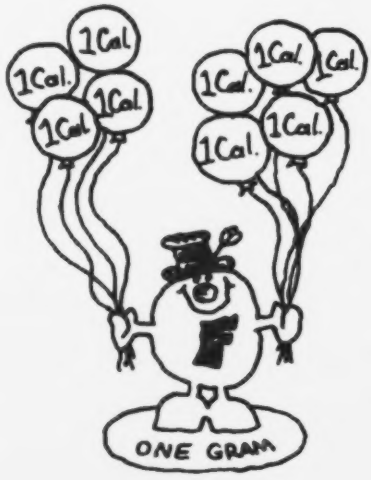
—Which group has the most Calories in its circle?
(Fat.)

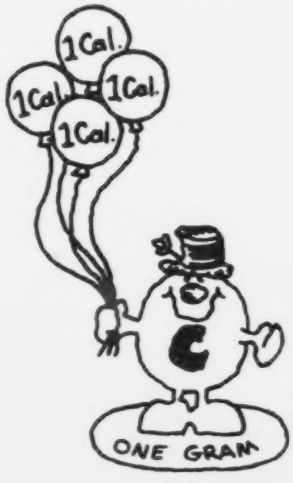
—Which nutrient has the most Calories in one gram?
(Fat.)

—If fat has more Calories packed into one gram than carbohydrate and protein, how would that affect the energy value of foods that contain a lot of fat?
(Foods high in fat are high-energy foods.)

Reinforce the concept that fat is a more concentrated source of energy because it contains more Calories per gram than either carbohydrate or protein.

(continued)



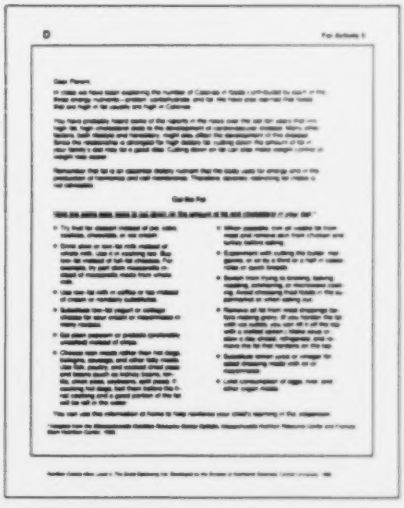


Give each student a copy of work sheet C. Have them guess which food in each pair has the greater number of Calories. Ask them to explain why they think one food has more Calories than the other. Then give them the correct Calorie values for each of the foods as listed in the chart and discuss their answers. Stress that adding fat or sugar to low-Calorie foods increases their Calorie value.

High Calorie		Low Calorie	
Slice of apple pie =	350 Cal.	1 apple =	100 Cal.
10 french fries =	155 Cal.	Baked potato =	95 Cal.
1 cupcake =	150 Cal.	Slice of bread =	70 Cal.
Vanilla ice cream cone =	160 Cal.	Skim milk =	90 Cal.
12 oz. orange soda =	165 Cal.	1 orange =	65 Cal.

Letter to Parents

To help involve parents in their children's learning, give each student a copy of letter D to take home. The letter emphasizes the relationship between high-fat, high-cholesterol diets and heart disease and lists suggestions for decreasing dietary fat. Review and discuss the suggestions with the students before they take the letter home.



Additional Activity

High-Calorie vs. Low-Calorie Foods

Have students determine how many servings of a low-Calorie food from each pair on work sheet C would equal the Calorie value of one serving of a high-Calorie food.

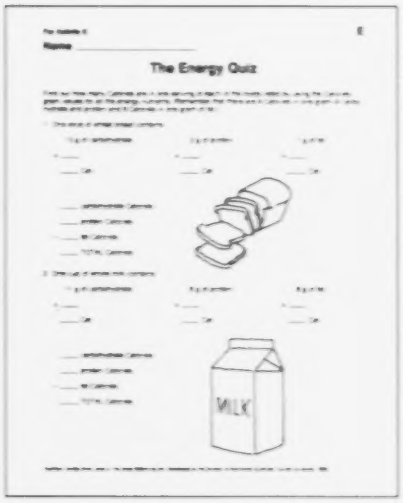
Adding It All Up

Advance Preparation

Make an Energy Wheel out of heavy poster board or oak tag by following instructions on the next page.

Have each student bring in a label from a food package, can, or box.

Copy work sheet E for each student.


The Energy Quiz

MILK

Learning the Label Lingo

You can find out the number of grams of each energy nutrient a food contains by checking its label or looking it up in a nutrient chart. Besides nutrient information, labels also provide other valuable information about food.

Have students study the food labels they brought in and discuss the following questions:

—What information is found on food labels?
(Amounts of nutrients, serving size, number of Calories, ingredients, name of the food packager, and possible ways to cook the food.)

—Why should you read food labels?
(To learn what ingredients and nutrients and how many Calories the food contains.)

—What foods don't have nutrient labels?
(Fresh fruits, vegetables, meats, and generic items.)

—What additional information would you like to see on a label?

Make three columns on the board and label them "Fat," "Carbohydrate," and "Protein." Have the students write the names of the foods on their labels under the column that shows the nutrient it contains the most of.

Make some generalizations from the groupings, such as "A lot of sweets and desserts are in the fat column," "Vegetables seem to be in the carbohydrate column," "Sweets seem to have more fat than vegetables," and so on.

What's Your Energy IQ?

Distribute copies of work sheet E to each student. Have them complete the quiz using the Calorie values per gram for each energy nutrient. Point out that whole milk has 8 grams of both protein and fat yet the fat provides more Calories. Skim milk has almost no fat and therefore half the Calories of whole milk.

A Nutrient Label

Serving Size: 1 cup (28.4 grams) with ½ cup skim milk	
Servings per package: 13	
Calories	150
Protein	6 grams
Carbohydrate	31 grams
Fat	0 grams

Sample Calculations

31	6	0
x 4	x 4	x 9
124	24	0

124 carbohydrate Calories
24 protein Calories
\+ 0 fat Calories
148 TOTAL Calories

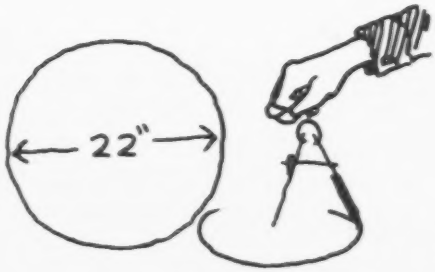
(continued)

The Energy Wheel

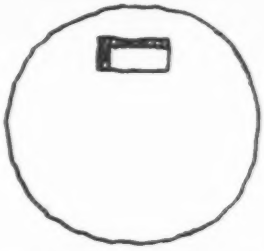
Set up the Energy Wheel in a corner of the classroom where students can work individually on it. Encourage students to do the Energy Wheel activity. They should compute the total Calorie values for the foods under the wheel as shown in the diagram. Put new labels under the wheel when everyone has completed the exercise at least once.

Making an Energy Wheel

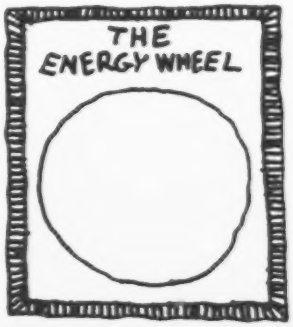
1. Using heavy poster board, 22" x 28", and a compass, draw two circles, each 22 inches in diameter.



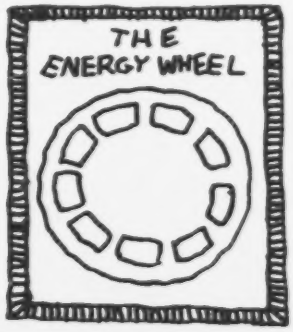
2. Cut out the circles using sharp scissors or an exacto knife (available in most art departments).
3. Cut out a small window the size of an average nutrient label in one of the circles.



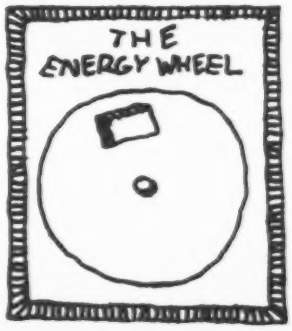
4. Staple the uncut circle to a bulletin board or cork board.



5. Take the nutrient labels the students brought in and black out the values for total Calories with a marker. Write the name of the food at the top of the label if necessary.
6. Number all the labels. You will probably be able to use ten to fifteen on one wheel.
7. Attach the labels around the perimeter of the circle stapled on the bulletin board.



8. Place the circle with a window in it on top of the other circle and secure it with a thumbtack or small nail.



9. Have pencils and envelopes for blank and completed answer sheets available. You may want to keep a calculator near the wheel for students to use.
10. Put new labels on the wheel after all students have gone through it at least once.

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The Great Balancing Act Section 1

Evaluation

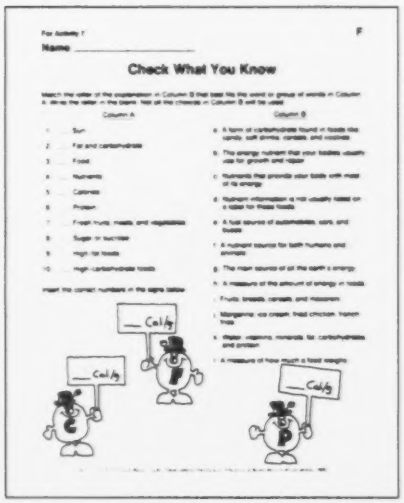
Advance Preparation

Copy work sheet F for each student.

Reviewing What You've Learned

Distribute work sheet F and instruct students to complete it by matching the letters in column B with the correct numbers in column A. Tell them to write the letters in the blanks provided. Correct and discuss their answers as a class.

Answer Key:
1. g; 2. c; 3. f; 4. k; 5. h; 6. b; 7. d; 8. a; 9. j; 10. i


For Activity 7 F

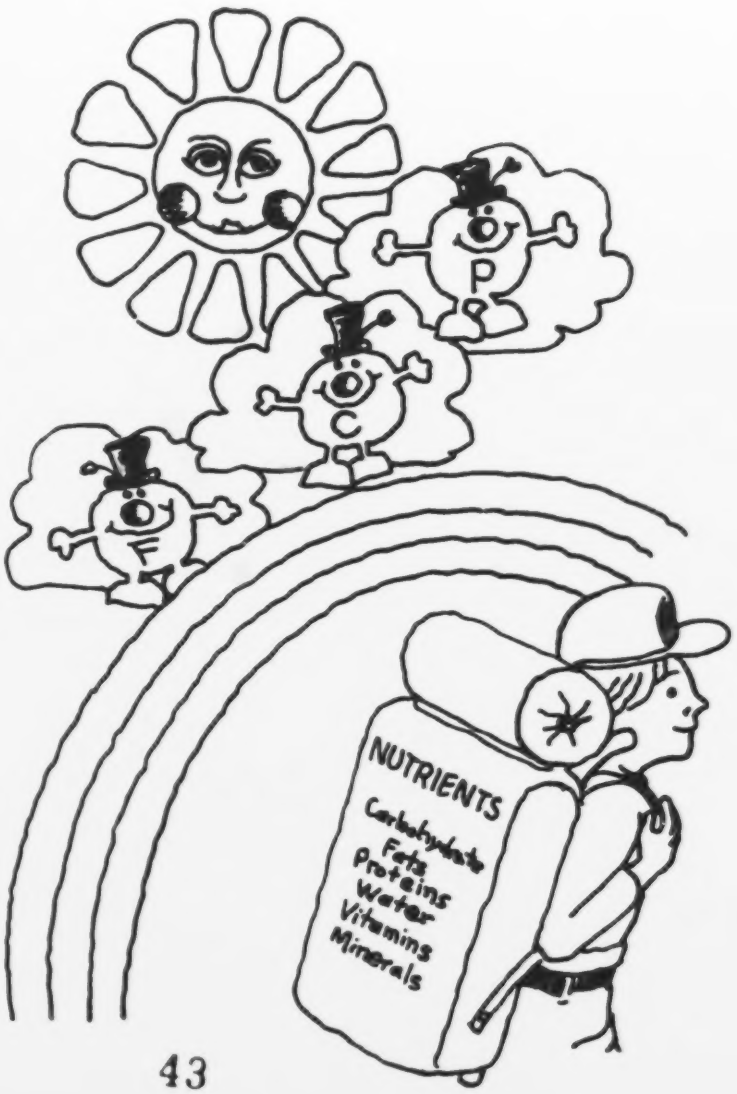
Name _____

Check What You Know

Match the letter of the explanation in Column B that best fits the word or group of words in Column A. Write the letter in the blank. Next all the choices in Column B will be used.

Column A	Column B
1. ___ Sun	a. A form of carbohydrate found in foods like cereals, soft drinks, cereals, and cookies
2. ___ Fat and carbohydrate	b. The energy nutrient that your bodies usually use for growth and repair
3. ___ Food	c. Nutrients that provide your body with most of its energy
4. ___ Nutrients	d. Nutrient information is not usually listed on a label for these foods
5. ___ Calories	e. A food source of carbohydrate, iron, and protein
6. ___ Protein	f. A negligent source for both humans and animals
7. ___ Fresh fruits, meats, and vegetables	g. The main source of all the earth's energy
8. ___ Sugar or sucrose	h. A measure of the amount of energy in foods
9. ___ High fat foods	i. Fruits, breads, cereals, and macaroni
10. ___ High carbohydrate foods	j. Margarine, ice cream, fried chicken, frozen pizza
	k. Water, vitamins, minerals, fat, carbohydrates, and protein
	l. A measure of how much a food weighs

Insert the correct numbers in the signs below.



Section 2

The Great Balancing Act

Putting Food Energy to Work for You

Understanding:

Three nutrients in food provide our bodies with energy for daily living and activity.

Before You Start

The human body is an amazing engine. It "burns" energy provided by nutrients in foods to give the power needed to pump blood, breathe, run, teach, ride a bike, and do everything else we expect our bodies to do. Taking in more energy than our bodies can burn results in excess energy, which is stored as fat and shows up on the scale as weight gain. Over time, this imbalance can lead to overweight or obesity.

Millions of Americans are overweight, including elementary age students. In fact, about one child in every five weighs too much. Research has shown that lack of exercise—not overeating—is the primary reason for childhood obesity. Many overweight adults these days are trimming down and toning up, but younger members of our population are not showing the same interest. A study of 10,000 youngsters in grades 5 through 12 revealed that 50 percent of all American children are physically unfit.

Another problem facing our society today is the recent increase in the incidence of serious eating disorders such as anorexia nervosa and bulimia. One common characteristic of these two disorders is an overwhelming desire to become and remain thin. Although a means to prevent anorexia and bulimia is unknown, it is hoped that by teaching children and young adults that weight is not the only determinant of a healthy and physically fit body, the incidence of these disorders will decrease.

Activities in this section promote a greater understanding of how to balance the energy consumed in foods with energy-expending exercises to improve overall health, physical fitness, and emotional well-being.

Activities	Subjects
8. Inside Energy	Language Arts/Science
9. The Energy Equation	Math/Science
10. The Fitness Four	Fitness
11. Exercise and Energy	Fitness
12. Your Heart and Lungs Team	Science/Fitness
13. Evaluation	Math

Resources

What's Inside of Me? S. Zim. New York: Morrow, 1952.
To help young people understand their bodies, short chapters explain how we digest food, how the heart works, how our muscles are controlled, and many other things. Large-type pages are included that can be read by children as young as seven or eight, and small-type pages with more detailed text to be read aloud by an adult.

Running Basics. C. L. Benjamin. Englewood Cliffs: Prentice-Hall, 1979.
Complete information is provided on how to start running, including running techniques and exercises to warm up and cool down. There even are hints on how to keep a running diary and start a running program at your school. Useful advice is presented in an easy, informal style.

About Your Heart. S. Simon. New York: McGraw-Hill, 1974.
In this Let's-Try-It-Out book, children are encouraged to discover for themselves just how their hearts work. Large, multicolored drawings illustrate how blood flows in and out of the heart and reaches all parts of the body. Simple do-it-yourself projects actively involve the reader in learning.

You Can't Make a Move without Your Muscles. P. Showers. New York: Harper & Row, 1982.
This Let's-Read-and-Find-Out science book tells the reader how muscles facilitate movement of the body. Smooth and skeletal muscles are compared. The importance of routinely using your muscles is stressed. Simple "try this" activities and illustrations enhance the discussion.

The Human Body: The Muscles. K. Elgin. New York: Franklin Watts, 1973.
Beginning with a general discussion of skeletal, smooth, and cardiac muscles, the book progresses to descriptions of specific muscles in the body. Simple drawings enhance the text.

Consider a subscription to ***Fitting In*** magazine, an American Alliance for Health, Physical Education, Recreation, and Dance publication for students in the upper elementary grades. Write to American Alliance for Health, Physical Education, Recreation, and Dance, 1900 Association Drive, Reston, VA 22091.

This eight-page monthly reader covers issues of health, fitness, nutrition, and exercise. Special features include fitness self-tests, celebrity interviews, a fun page, and classroom stretches. A teacher's resource guide accompanies each issue and provides additional classroom projects. AAHPERD also publishes many other resources related to health and fitness so request a free catalog.

FITNESSGRAM was developed by the Institute for Aerobics Research and is presented by the President's Council on Physical Fitness and Sports and the American Alliance for Health, Physical Education, Recreation, and Dance. It is sponsored by Campbell Soup Company. The program delivery model includes three levels. First is direct service in which the Institute for Aerobics Research produces and prints the fitness report cards for each enrolled school district. Also included is microcomputer software for use with the Ap-

ple IIe, two disk drive, 64K microcomputer, which allows participating schools to print their own fitness report cards. A third area is the availability of consultants to help selected districts program large computer systems to produce and print fitness report cards locally.

To enroll your school district in the **FITNESSGRAM** computer program, write to Youth Fitness, Institute for Aerobics Research, 12250 Preston Road, Dallas, TX 75230.

The National Children and Youth Fitness Study 1980: A Summary of Findings. McGinnis, J. M. et al. Office of Disease Prevention and Health Promotion, Department of Health and Human Services, Washington, DC 20201. Write to Dr. Robert Gold at this address for a free copy.

A rigorously controlled mass testing study of fitness among 8,800 children and youth in grades 5-12 from 140 schools in 19 states in the United States has implications for health promotion objectives for the nation for the year 1990. Findings were based on weekly time spent in physical activity, effect of seasonality on physical activity, participation in community organizations, and pursuit of activities that may readily be carried into adulthood.

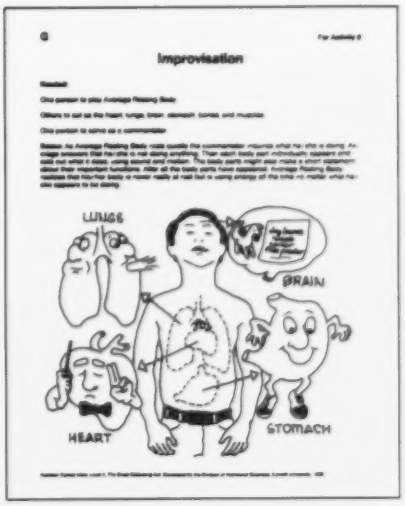
Inside Energy

Advance Preparation

Review material on improvisational drama (see Appendix 3).

Copy information sheet G for students doing that activity.

Copy work sheet H for each student.


G

Improvisation

LUNGS

BRAIN

HEART

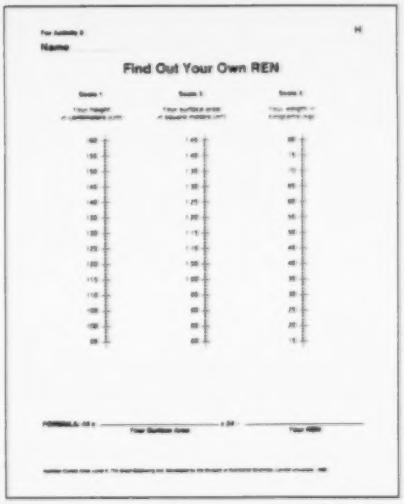
STOMACH

Key Words

Resting energy needs, basal energy needs

What's Going on Inside?

The energy in food supplies our bodies with energy to move, grow, and live. Even when we are not moving our arms or legs, the cells inside our bodies are doing active work that requires energy.


H

Name

Find Out Your Own REN

Different groups of cells make up our internal organs. These internal organs and their functions include the heart beating, lungs breathing, stomach digesting food, brain thinking, and bones and muscles growing and repairing themselves. Nutritionists and scientists often use the term resting energy needs (REN) to refer to this energy cost of staying alive. Basal energy needs or basal metabolism is another term often used for our energy cost of living. It differs from REN in that it does not take into account the energy cost of digestion.

Each person's REN will differ depending on that individual's height, weight, sex, and percentage of body fat and muscle. Taller, heavier people have a greater body surface (or skin) area than smaller, lighter-weight people. As surface area increases, so does the amount of area from which body heat escapes. This means a large body needs more energy than a smaller one to make up for heat loss and maintain body temperature.

The proportion of body fat to bone and muscle is a measure of a person's body composition. Fat tissue does not require as much energy to sustain itself as muscle or bone, so a person with a high percentage of body fat will need less energy than one whose body is primarily lean tissue, such as a well-trained athlete. Women by nature tend to have more fat stores than men of equal weight. This means they usually have a lower REN, although for very active women the difference is minimal.

You Think I'm Resting, But I'm Not!

Ask for volunteers to play the character Average Resting Body and act out the improvisation described on information sheet G. Give each actor a copy of information sheet G and allow 15 to 20 minutes for the group to work out the scene together. You might want to visit the group to listen to their ideas and make suggestions if necessary.

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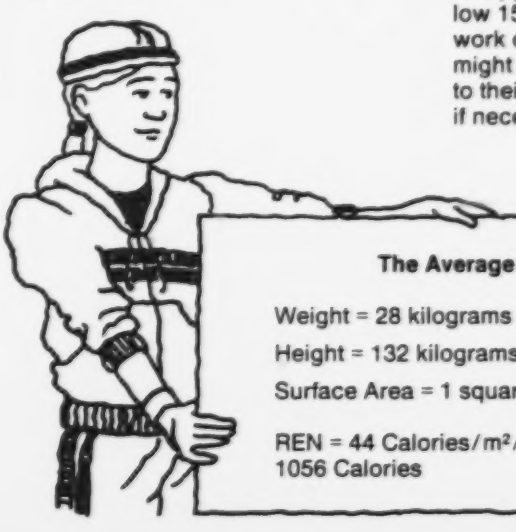


The Average Nine-Year-Old

Weight = 28 kilograms (62 pounds)

Height = 132 kilograms (52 inches)

Surface Area = 1 square meter

REN = 44 Calories/m^2/hour x 1 m^2 x 24 hours = 1056 Calories

After the improvisation is over, discuss what the actors were trying to portray.

—Was Average Resting Body really resting?

—Can you think of other body parts besides the heart, lungs, stomach, and brain that always need or use energy?

—How might you feel if the food you ate did not provide enough energy to meet your resting energy needs?

—Can you really sit completely still or not move at all?

Pulse Power

Have students find their pulses by placing their middle and index fingers over their wrists or on the side of their necks as shown in the diagram. Explain that the beat is the heart pumping blood and nutrients to all parts of their bodies. Remind them that this process takes energy. Have students count their heartbeats for one minute. Or they could count for 15 seconds and then multiply by 4.

Lifting Your Lungs

Have students place both hands on their rib cages and take several deep breaths. Explain that the up and down movement they feel is caused by special muscles that lift their ribs so air can get in and out of their lungs. These muscles use energy with each breath. The students could use a measuring tape to measure the width of their chests before breathing and then again while holding their breath. Have them compare the two results to see how much their lungs expanded.

Additional Activity

Find Out Your Own REN

Students can determine their own personal resting energy needs, using the formula and chart provided on work sheet H. Tell them to locate and mark the points on Scales 1 and 2 in the work sheet that represent their height and weight. To convert pounds to kilograms, tell them to divide their weight by 2.2. Have them draw a straight line connecting the two points. Explain that the point where the line crosses Scale 3 represents their body's surface area, or total amount of skin, in square meters. Have students imagine being able to step out of their skin, lay it down flat, and measure its total area. The total area of their skin is the same as their body surface area.

Tell students to plug the figure they got for their surface area into the formula. Then have them calculate the amount of energy their bodies need each day to meet their resting energy needs. An average nine-year-old expends 44 Calories of energy each hour, per square meter of body surface area. It might be helpful to have a calculator available because the calculations could involve decimal multiplication.

The Energy Equation

Advance Preparation

Obtain

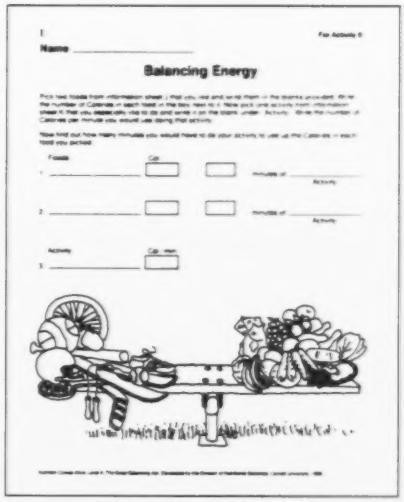
10 objects of equal weight.

2 heavier objects of equal weight.

12 adhesive labels (or several strips of masking tape).

A balance scale.

Copy work sheet I and information sheets J and K for each student. (Save information sheets J and K for Activity 13.)


Name _____

Balancing Energy

An Energy Plus

The total amount of energy a person expends each day includes resting energy needs and the energy used for physical activity. When total energy expended is less than the total amount of food energy consumed, the extra Calories are stored as fat. One pound of fat is equal to 3500 Calories. This "energy plus" becomes a concern only when so much excess body fat accumulates that it interferes with a person's overall health and well-being.

Energy In > Energy Out =

Although excess body fat is unhealthy, some amount of stored fat is beneficial. Inside the body, fat surrounds important organs like the heart, lungs, and kidneys and protects them from getting jarred or damaged. Fat layers under the skin help insulate the body and provide a protective cushion for bones and muscles.

An Energy Minus

When the total amount of energy expended in activity is greater than the total amount of energy ingested, the body can compensate for this shortage by changing some of its stored fat back into usable energy.

Overweight children should not be encouraged to go on severe reducing diets because restricting a young child's energy intake below 1400 Calories a day can compromise growth and overall health. A safer approach would be to encourage them to maintain their current weight by eating well-balanced, lower-Calorie meals as their growth continues. In other words, they should try to reduce their rate of weight gain.

Energy In < Energy Out =

As children grow they form new bone and muscle or lean body mass (LBM). This increase in LBM results in weight gain. During middle childhood most children gain an average of five to seven pounds of LBM each year until adolescence, when their growth rate increases. This weight gain is both normal and necessary. Children who gain an excessive amount of weight as fat, rather than LBM, would be classified as overweight. One method for determining the approximate percentages of body fat and lean tissue is to measure the amount of fat directly under the skin using a caliper. With this instrument, a trained person can pinch and measure a fold of skin from a person's upper arm, stomach, back, or inner thigh. These skin fold measurements help differentiate whether weight gain is primarily in LBM, fat, or a healthy balance of the two.

(continued)

Staying in Balance

When energy ingested is equal to energy expended, the body is in energy balance and weight is neither lost nor gained. The best way to regulate a child's energy balance is to encourage physical activity and discourage overeating, particularly high-Calorie foods that contain little nutritional value.

Regular exercise will also help a child develop larger, stronger muscles and harder bones. Since more food energy is required to maintain lean tissues than fat tissues, a person who is active and physically fit will generally need more energy than one who is sedentary and out of shape.

Energy In = Energy Out =

Aside from the many physical pluses of regular exercise, there are emotional benefits as well. Active play provides a child with a constructive outlet for working off anxieties, stress, and anger—it is a key to good mental health at any age. As children learn to take pride in their bodies they also build self-confidence and self-esteem.

Tipping the Scales

Have students label one of the heavy objects "2400 Calories In" and the other "2400 Calories Out." Tell them these objects represent the average total energy needs (REN plus an allowance for physical activity) of a nine-year-old boy or girl. (Actual total energy needs of children this age may vary between 1700 and 3300 Calories, depending on the amount of physical activity a child gets, and still be considered normal.) Let the students balance the two objects on the scale to illustrate a person in energy balance.

Have them label five of the remaining objects with the names of the 100-Calorie foods listed below. Label the other five objects with activities and the times it would take to use up 100 Calories doing each one.

Have students place the food objects and the activity objects on the scale and observe their effect on the energy balance.

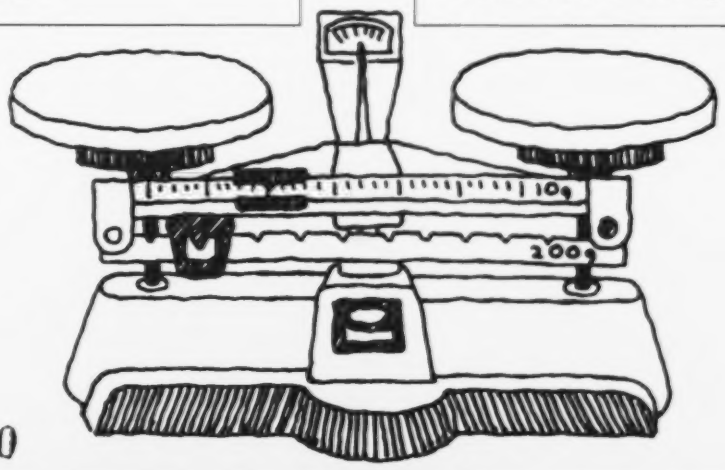
(continued)

100-Calorie Foods

- 1 banana
- 10 potato chips
- 1 baked potato
- 1 tablespoon peanut butter
- 3 cups plain popcorn, popped

100-Calorie Activities

- 50 minutes of walking
- 100 minutes of watching TV
- 25 minutes of playing basketball
- 20 minutes of running
- 30 minutes of bike riding



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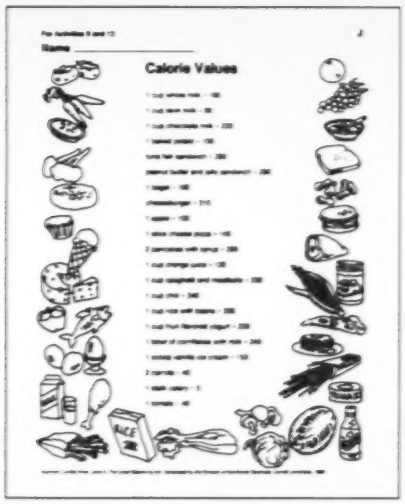
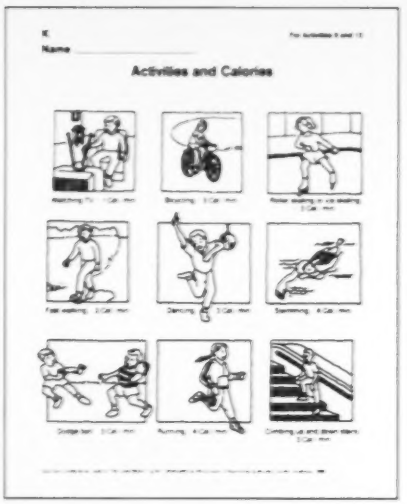




Balancing an Energy Seesaw

Distribute copies of work sheet I and information sheets J and K. Have students complete work sheet I by first choosing two foods and one activity from the information sheets. Tell them to compute how many minutes they would have to do their activity to burn up the Calories in each food. You may want to do an example on the board as shown in the diagram.

Food	
Peanut butter and jelly sandwich—290 Calories	
Activity	
Dancing	Walking
3 Cal./min.	3 Cal./min.
72 min.	145 min.

After students complete the work sheet find out which foods were chosen more than once and write their names on the board. Then discuss which activity took the least amount of time to use up the Calories in those foods.

Explain that activities that require a lot of muscle movement, such as running, use more energy in one minute than those that require less movement, such as walking.

Questions for conversation:

—If you ate a food with a high number of Calories, what activity might you choose to use up those Calories in the shortest amount of time?
(An activity that requires muscles to work hard.)

—Name some ways you could gain weight?
(Add lean body mass during growth or as a result of exercise. Add fat as a result of overeating or lack of exercise.)

—Which kind of weight gain can be unhealthy?
(Excess weight gained as fat.)

—What might cause you to gain excess weight as fat?
(Eating more Calories than your body needs and not getting enough exercise.)

—Name some physical health benefits of regular exercise.
(Stronger muscles, harder bones, maintenance of energy balance.)

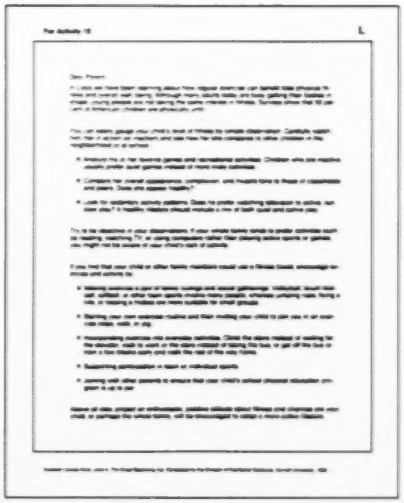
—Are there others?

The Fitness Four

Advance Preparation

Arrange with the physical education teacher to test the students' level of physical fitness using a standardized test developed by the American Alliance for Health, Physical Education, Recreation, and Dance (AAHPERD) or the President's Council on Physical Fitness and Sports. Or conduct the modified AAHPERD test yourself (see Appendix 4).

Copy letter L to parents for each student.



Fit Facts

Exercise is an important factor in maintaining or changing energy balance and is also necessary for achieving total physical fitness. A physically fit body can work at its best in all the different activities it does each day. Muscle strength, muscle endurance, flexibility, and heart-lung fitness are the four components of total physical fitness. These categories also serve as criteria for most fitness tests.

Discuss the different components of physical fitness and have students do the suggested exercises.

1. **Muscle Strength** is the greatest amount of work muscles can do in a single effort. Have students jump as high as they can from a standing position to test the strength of their leg muscles.

2. **Muscle Endurance** is demonstrated by how well a group of muscles can continue to work for a long period of time. Tell students to do as many bent-leg sit-ups as they can to test their abdominal muscle endurance.

3. **Flexibility** is the amount of movement a bone can make in any direction around a joint. Bones connect at joints such as knees and elbows. Tendons attach muscles to bones and allow them to move around joints. Have students touch their toes or do side bends and sit-and-reach stretches to stretch their tendons and make them more flexible.

4. **Heart-Lung Endurance or Cardiovascular Fitness** is demonstrated by how efficiently the heart and lungs transport energy nutrients and oxygen to other working muscles. Regular aerobic exercises such as swimming, fast walking, jogging, and biking get your lungs breathing deeply and your heart pumping harder so more oxygen and energy nutrients are sent to

(continued)

the moving muscles. Students might try jogging in place for at least five minutes to give their hearts and lungs a mild aerobic workout.

Cardiovascular fitness and aerobic fitness refer to the body's ability to burn food energy in the presence of oxygen. This process in turn supplies energy to all the body's moving muscles. A regular aerobic exercise program

—makes the heart more efficient so that it can pump out more blood, oxygen, and nutrients with fewer beats.

—develops the lungs' capacity to hold air so that more air is inhaled with each breath.

—increases the energy needs of all the other muscles—not only during exercise but during rest as well.

Fitness Degrees

After the students have completed a physical fitness test, take the average of the results of the entire class for each test component. Then help them cut the shape of a thermometer out of construction paper or newsprint, allowing one thermometer for each category they were tested in. Have them mark the thermometers with a range of possible scores for each category. Tell them to highlight the national norm, or average score, with a bright-colored marker.

Next, have students color in the fitness thermometers to represent the class average for each category. Discuss which categories the class did well in and encourage students to improve in the areas where their scores were lower than the national average. Repeat the fitness test after two or three months of exercising to see if the class moves up in fitness degrees.

Additional computer programs that help students explore energy balance, fitness, and other nutrition- or health-related issues are available for use in the classroom. For more information, contact your area Dairy Council or local Cornell Cooperative Extension office. (See Appendixes 1 and 2 for a complete listing of addresses and phone numbers.)

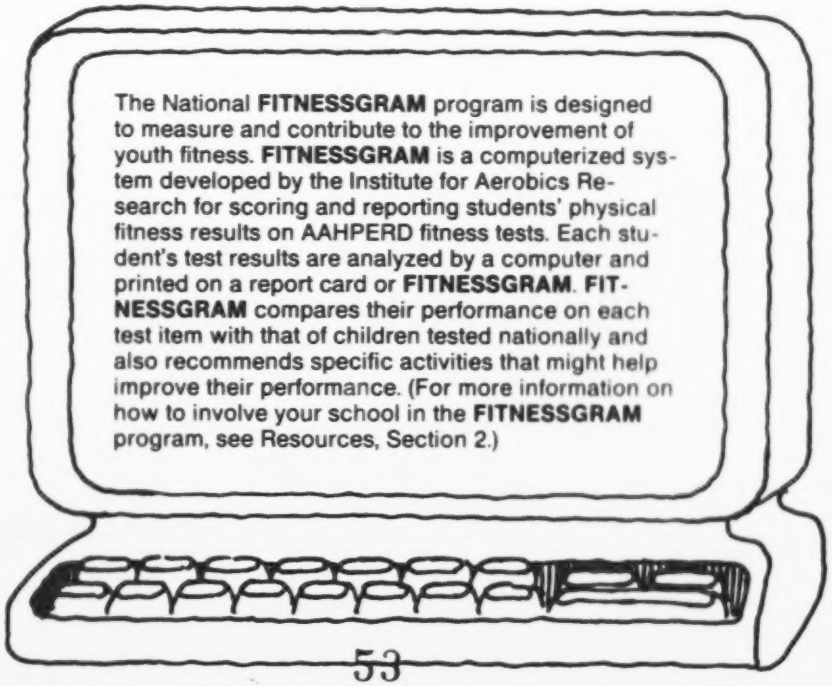
Letter to Parents

To help involve parents in their children's learning, give each student a copy of letter L to take home. The letter emphasizes the importance of regular exercise in promoting physical fitness. It also includes suggestions on how to incorporate physical activity into a busy lifestyle. Review and discuss the suggestions with the students before they take it home.

Additional Activity

Fitness Posters

Have students create designs for posters on health and fitness. Encourage them to keep the four fitness factors in mind when developing their slogans, logos, and illustrations for their posters. Vote on the ten best designs and have the class work on transferring them to poster board. Display the posters in prominent places in the school.


The National **FITNESSGRAM** program is designed to measure and contribute to the improvement of youth fitness. **FITNESSGRAM** is a computerized system developed by the Institute for Aerobics Research for scoring and reporting students' physical fitness results on AAHPERD fitness tests. Each student's test results are analyzed by a computer and printed on a report card or **FITNESSGRAM**. **FITNESSGRAM** compares their performance on each test item with that of children tested nationally and also recommends specific activities that might help improve their performance. (For more information on how to involve your school in the **FITNESSGRAM** program, see Resources, Section 2.)

Exercise and Energy

Advance Preparation

Collect

Two five-pound bags of sand, flour, or sugar or two five-pound ankle weights.

A canvas backpack.

Copy work sheet M for each student.

Are Your Muscles Moving?

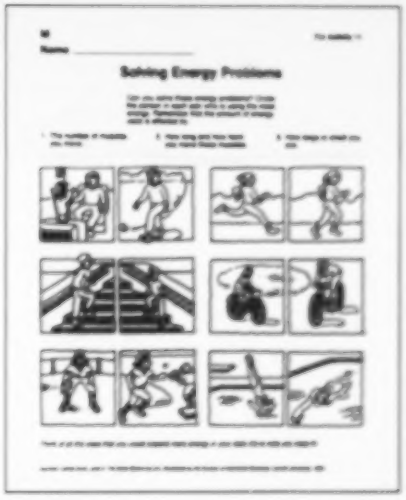
Different exercises use different amounts of energy depending on how much muscle action they require. Mild exercises such as hopscotch, yoga, softball, bowling, light stretching, and volleyball do not require vigorous, sustained muscle movement.

Strenuous exercises have the opposite effect. Activities such as cycling, swimming, square dancing, handball, basketball, jumping rope, and running require a great deal of energy and involve moving many muscles vigorously. These exercises can also offer aerobic (or heart-lung) conditioning if they are performed for 10 to 30 minutes continuously.

Medium exercises fall in between mild and strenuous ones and include slow walking, short sprints, kickball, badminton, table tennis, golf, and roller skating.

Exer-Size

A person's body size also affects how much energy he or she uses doing exercise. Taller or heavier people will use more energy than smaller or lighter people doing the same exercise. Distribute copies of work sheet M to each student. Have students complete the work sheet by


Solving Energy Problems

circling the person in each pair who is using more energy.

Emphasize that people do not all have to be the same size or shape. A body size and shape that is appropriate and healthy for one person may not be ideal for another.

(continued)

Ten More Pounds*

Have pairs of students take turns carrying the five-pound bags or weights in a backpack while they walk around the room, run, and go up and down stairs. Have them repeat the activities without the extra weight. After everyone has taken a turn, discuss how it felt to carry the extra weight. Ask students the following questions:

—How did you feel carrying the extra weight?

—Which situation required your body to use more energy?

—How would you feel if you had to carry more than ten pounds?

Emphasize that carrying weights is not the same as gaining weight because weight gain is more evenly distributed over the body.

Make a Mountain of Energy

Have students cut the shape of a mountain out of construction paper and attach it to a wall or bulletin board. Have them write suggestions for mild, medium, and strenuous exercises on colored index cards or squares of construction paper. Attach the suggestions for mild exercises at the base of the mountain, medium exercises midway up, and strenuous or aerobic exercises at the top.

Try to lead the class in an exercise from the mountain at least one day each week. Suggest that students climb to the top of the mountain (do strenuous, aerobic activity) at least three times each week to give their hearts and lungs the workout they need.

Additional Activities

Improvisation

Have students do an improvisation of how they would move, walk, run, and breathe if they weighed more than 500 pounds.

Personal Exercise Record

Have students keep a personal exercise record for at least three days. Have them add up the number of minutes spent in mild, medium, or strenuous physical activity each day. Tell them to make a bar graph of the results and label very active days "Energy Peaks" and less active days "Energy Valleys."

*Adapted from **It's Your Move!** 4-H Teen Nutrition Education Program by Susan E. Travis, Division of Nutritional Sciences, Cornell University, 1982.

Your Heart and Lungs Team

Advance Preparation

Obtain

A one-gallon small-mouth glass jar (a cranberry juice jar works well) with the label removed.

A plastic dishpan, plastic funnel, 500-milliter beaker, 24-inch piece of rubber tubing, and roll of masking tape.

Plastic straws for each student (bendable plastic straws can be used in place of the tubing and regular rigid straws).

A stop watch or watch with a second hand.

Discovering the Dynamic Duo

The heart and lungs are an amazing team. They work together to send oxygen and nutrients to all parts of the body including bones, muscles, and other organs.

Muscles require more oxygen and energy nutrients during exercise than when they are at rest. To keep up with these increased needs the heart and lungs have to work harder.

People who regularly do exercises that require their hearts and lungs to work harder develop an increased lung capacity (they take in more oxygen with each breath so they do not have to breathe as often) and a decreased heart rate (the heart pumps out more blood with each beat so it does not have to beat as often).

Any exercise can improve aerobic fitness and lower resting heart rate if it forces the heart to beat at about three-quarters of its maximum rate. For most nine- or ten-year-olds, the maximum heart rate is 200 beats per minute. Therefore, for exercise to be aerobic it should get the pulse rate up to about 140 to 170 beats per minute. This range is called their "target zone" for aerobic exercise.

The following activities help students find out how fit their hearts and lungs are.

Measuring Your Lung Capacity*

Place a strip of masking tape vertically on the full length of the gallon glass jar. Have students fill the jar with water in 500-milliter increments, using the 500-milliter beaker. Tell them to mark the tape at the new water level each time they add water to the jar. Explain that carefully marking off known amounts of water is called calibrating.

After the jar is calibrated, fill it completely with water. Put about three inches of water in the plastic dishpan. Have one person completely

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*This activity was contributed by Verne Rockcastle, professor of science and environmental education, Cornell University, 1985.

cover the mouth of the jar with the palm of his or her hand while two others quickly turn it upside down in the dishpan. Once the mouth of the jar is under water, the hand can be removed, but another person should continue to hold the jar upright.

Insert one end of the rubber tube into the mouth of the jar without lifting it out of the water. If using bendable straws, push the flexible part into the jar. Have each student in turn attach his or her straw to the tubing and then take a deep breath and exhale completely into the jar. Explain that the amount of water they displace from the jar represents the maximum amount of air their lungs can hold, or their "lung capacity." Remember to refill the jar with water after each person has been tested.

The students might like to make a large bar graph of their individual lung capacities.

Hit Your Target

Have each student count his or her pulse for one minute to determine the resting pulse rate. The average resting heart rate for a nine- or ten-year-old is 70 to 100 beats each minute. Remember, this is just an average rate. A nine-year-old can have a heart rate of 115 and still be healthy. Level of fitness, age, and size are several factors that can cause a person's resting heart rate to vary.

—Larger people generally have slightly lower resting heart rates than smaller people.

—As people age, their resting heart rates tend to decrease.

—People who are physically fit have lower resting heart rates than people who are out of shape.

Have students jump or run in place for at least five minutes so their pulses can reach their "target zone." Immediately after they stop exercising have them take their pulses for one minute. Tell them to compare this number with their resting heart rates.

If their heartbeats returned to the resting rate in one minute after doing the aerobic activity, it is a good indication that they are in fairly good physical condition. Taking more than one minute does not necessarily indicate a person is in poor shape, but it does mean that his or her level of fitness could be improved.

Additional Activity

Graph

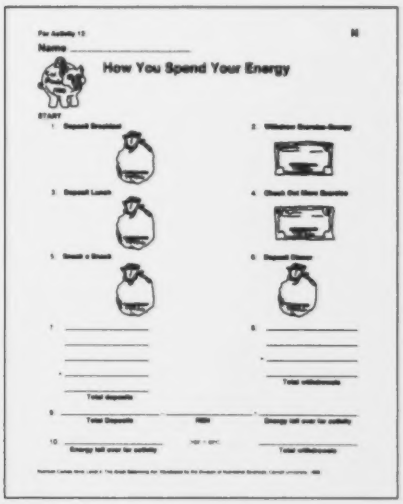
Have students compare their resting heart rates to their lung capacities by plotting these values on a graph. Students with lower resting heart rates will usually have larger lung capacities and vice versa.

Evaluation

Advance Preparation.

Copy work sheet N for each student.

Distribute copies of information sheets J and K.



How You Spend Your Energy

Distribute copies of work sheet N to each student. Explain that each has 1400 Calories in his or her energy bank. This figure represents the resting energy needs of an average nine- or ten-year-old. Tell students to choose foods for each meal and write their total Calorie value in the deposit bags on the work sheet. Next they should choose an exercise or exercises they would like to do and, in the space provided for the withdrawals, write down the total amount of energy they would expend in this exercise. Explain that they are trying to see if they can balance the total amount of energy they might expend in a day with the total amount of energy they might consume.

Tell students to calculate their energy balance by completing steps 7 through 10. If the figures for leftover energy and total energy expended are equal, or fairly close, they have balanced their energy. Discuss what those who were not in balance might do to help balance their energy, such as adding more exercise or omitting certain high-Calorie foods.

Section 3

The Great Balancing Act

Energy Inputs and Outputs through History

Understanding:

Changes in eating patterns and exercise levels resulting from technological changes affect a person's ability to maintain energy balance.

Before You Start

Exercise levels and food intake patterns in our country have changed dramatically over the last two hundred years. Although few people nowadays do hard physical work, most of us still eat three large meals a day, supplemented with Calorie-rich snacks. Advances in technology have virtually eliminated the need for strenuous work and activity and at the same time have given us a greater variety of tempting food to choose from.

Work sheets, activities, and projects will help students learn how their lifestyle compares with that of an early New Yorker. They will also discover how to incorporate more physical activity into their daily lives to try to counteract the increasing American tendency toward sedentary behavior.

Activities

14. Moving with Ease
15. Find Time for Fitness
16. Expending Energy
17. Cooking Then and Now
18. Evaluation

Subjects

Social Studies/Math
Social Studies/Music/Fitness
Fitness/Math
Social Studies/Language Arts
Social Studies/Language Arts

Resources

Indians on the Move. R. Hofsende. New York: Morrow, 1970.
In this concise, explicit book on how Indians traveled, simple methods such as walking or riding, as well as special forms of movement that required equipment such as canoes and snowshoes, are explored. Text and illustrations diagram how many of these items were made.

Indians of the Eastern Woodlands. S. Sheppard. New York: Franklin Watts, 1975.
The family structure, ways of life, music, and art of the North American Indians are presented in a concise, well-documented account. Later chapters focus on present-day problems of Native Americans and their outlook for the future. It is an accurate, exciting tribute to our first Americans.

Iroquois Social Dances. Vols. I, II, and III. Irocrafts, R. R. 2, Oshwehken, Ontario NOA-1MO, Canada.
These long-playing records include traditional dance songs of Native Americans in the northeastern part of the United States. A leaflet that supplies information about the origin and background of each song is included.

Honor Your Partner: Folk Dances, Play, Party, and Singing Games. Freeport: Educational Activities, 1975.
This two-album set includes music and instructions for more than six different folk dances. Each dance is first taught in a simplified manner, followed by suggestions for more complicated variations.

Music for Movement Exploration. K. Lee. KBH Productions, 1970.
This record is designed to help the elementary classroom teacher or physical education specialist guide students through movement exploration. The child is encouraged to move to the sounds that he/she hears. A teacher's guide is included.

Life in Colonial America. E. G. Speare. New York: Random House, 1963.
Diaries, letters, travelers' tales, and reconstructed colonial villages provide the factual basis for a vivid and beguiling account of how Americans lived from the first settlements at Jamestown down to the Revolution.

My Side of the Mountain. J. George. New York: E. P. Dutton, 1959.
A unique and exciting account of a modern boy's adventurous year of self-sufficiency living off the land in a remote area of the Catskill Mountains. Quoting excerpts from his diary, Sam Gribley recounts in detail his experiences, emotions, reactions, and minute observations of the changing weather and plant and animal life from his home inside a hollowed-out tree.

Indian Dancing and Costumes. K. Powers. New York: Putnam's, 1961.
Step-by-step instructions and photographs lead you through basic body movements and steps. Information on the history of Indian dance is included as well as directions for assembling authentic Indian costumes and hints on how to stage a powwow.

Aerobics Basics. J. D'Amato. Englewood Cliffs: Prentice-Hall, 1983.
This book reveals the popularity and benefits of aerobics while focusing on aerobic dancing as a fun way to exercise. It explains how to start dancing and offers a fully developed program of illustrated dance routines.

I Love to Dance. G. Zeck. Minneapolis: Carolrhoda Books, 1982.
This exuberant photo essay is a true story about a ten-year-old boy named Tony Jones who loves to dance. Tony describes his life, how he got involved in dance, his rigorous schedule, and his dreams.

The Early American Cookbook. H. O'Connor. Englewood Cliffs: Prentice-Hall, 1974.
This book includes a fascinating introduction that describes the historical background of many colonial foods. Many of the recipes are adapted for the modern cook from the original colonial sources, but traditional cooking methods and ingredients have been retained.

The Colonial Cookbook. L. R. Penner. New York: Hastings House, 1976.
This book is a delightful recreation of eating patterns in the 13 original colonies, complete with recipes for home or classroom use. Attractive reproductions of early drawings add to its historical value for young readers.

The Joy of Cooking. I. S. Rombauer and M. R. Becker. Indianapolis: Bobbs-Merrill, 1975.
This popular book includes hundreds of recipes and many invaluable cooking tips.

The Better Homes and Gardens Cookbook. New York: Meredith, 1981.
Recipes, a Calorie chart, and conversion tables are all included in this handy cooking guide.

Foods the Indians Gave Us. W. and R. Hays. New York: Ives Washburn, 1973.
This fascinating account of foods we eat today that were given to us by the Indians of North and South America also includes recipes and gardening tips.

Slumps, Grunts, and Snickerdoodles: What Colonial Americans Ate and Why. L. Perl. New York: Seabury Press, 1975.
Recipes for authentic colonial foods are interwoven with stories of how the foods were developed and consumed. The combination successfully conveys an image of the changing culture.

The Last Hundred Years: Household Technology. D. Cohen. New York: M. Evans, 1978.
Home life from the early 1800s through the present is described, with details on changes in modern technology that revolutionized American life. Chapters cover transitions from old to new in kitchen, bathroom, bedroom, and home entertainment areas. Filled with instructive photographs and drawings, this is a fascinating look at parts of daily life easily taken for granted.

Moving with Ease

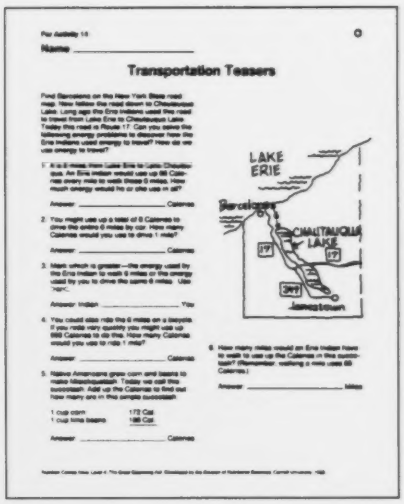
Advance Preparation

Obtain

Four or five recent New York State road maps.

Books on Native Americans of the northeastern woodlands (Resources, Section 3) (optional).

Copy work sheet O for each student.



Transportation Teasers

Name _____

Find Barcelona on the New York State road map. Now follow the road down to Chautauqua Lake. Long ago the Erie Indians used this road to travel from Lake Erie to Chautauqua Lake. Today this road is Route 17. Can you solve the following energy problems to discover how the Erie Indians used energy to travel? How do we use energy to travel?

1. It is 6 miles from Lake Erie to Lake Chautauqua. An Erie Indian would use up 66 Calories every mile to walk those 6 miles. How much energy would he or she use in all?

Answer _____ Calories

2. You might use up a total of 6 Calories to drive this entire 6 miles by car. How many Calories would you use to drive 1 mile?

Answer _____ Calories

3. Mark which is greater—the energy used by the Erie Indian to walk 6 miles or the energy used by you to drive the same 6 miles. Use "<" or ">".

Answer: Indian _____ You

4. You could also ride the 6 miles on a bicycle. If you rode very quickly you might use up 600 Calories to do this. How many Calories would you use to ride 1 mile?

Answer _____ Calories

5. Native Americans grew corn and beans to make Succotash. Today we call this succotash. Add up the Calories to find out how many are in this simple succotash.

1 cup corn 172 Cal
1 cup lima beans 198 Cal

Answer _____ Calories

LAKE ERIE
Barcelona
CHAUTAUQUA LAKE
17
17
394
Jamestown

6. How many miles would an Erie Indian have to walk to use up the Calories in this succotash? (Remember, walking 1 mile used 66 Calories.)

Answer _____ Miles

Native American Travel

Our means of transportation are very different from those of Native Americans long ago. We rely on cars, trains, buses, boats, and planes to take us where we want to go. We even have rocket ships that can send people into outer space. Native Americans did not have these vehicles. They had to depend on canoes, snowshoes, or their own two feet for transportation. Compare and contrast these methods of transportation for your students.

Canoes were the fastest form of travel available to Native Americans in the northeastern part of the United States. They were usually built from birchbark or hollowed-out logs. During winter, snowshoes were worn for traveling through deep snow. Snowshoes enable a person to walk on top of snow without sinking. When Native Americans traveled by foot, they usually followed well-worn trails through the forests. Many major highways and roads in New York State, including the New York State Thruway, were once old trails.

Transportation through Time

Divide the class into groups of five or six students. Give each group a New York State road map. Have students identify and list the different transportation systems shown on the map, such as roads, railroads, canals, and airports. Have them compare these methods of transportation with those Native Americans relied on long ago.

Your local historical society or public library might have maps of old trails in your area that you could borrow or photocopy. Have students compare these maps to a recent map of the local area. They might find out that the street or road they live on was once a trail.

Questions for conversation:

—Do we still use any Native American methods of transportation?

—Why are these methods rarely used today?
(They require a lot of personal energy expenditure. They are not fast enough.)

—Do people today expend much of their own personal energy when they travel?

—What sources of energy do they use?

—Which methods of transportation today require great personal energy expenditure?
(Rowing, sailing, horseback riding, walking, running, cross-country skiing.)

(continued)

Tracing a Trail

Divide the class into groups of four or five students. Give each group a New York State road map. Have each group trace a route on the map in pencil that they might travel to get from one area of the state to another. Tell them that they can use whatever means of transportation they think is appropriate. Have them pretend they are Native Americans living more than 200 years ago and repeat this activity. In which situation would they expend more personal energy and rely on their own muscle power?

Distribute copies of work sheet O. Have students complete the math problems and discuss their answers.

Additional Activities

Transportation Research

Have students research the history of one form of transportation. They might study how the first automobile, bicycle, rocket ship, or airplane was invented. The construction of the Erie Canal could also be explored.

Transportation Trail

Make a transportation trail in your classroom or gym. Set up stations along the trail with directions for doing activities that a Native American might have done if he or she were traveling along the trail 200 years ago. Include activities such as paddling a canoe, chopping wood for a fire, leaping over logs, and crossing a stream.

Find Time for Fitness

Advance Preparation

Obtain one or more of the following records (Resources, Section 3)

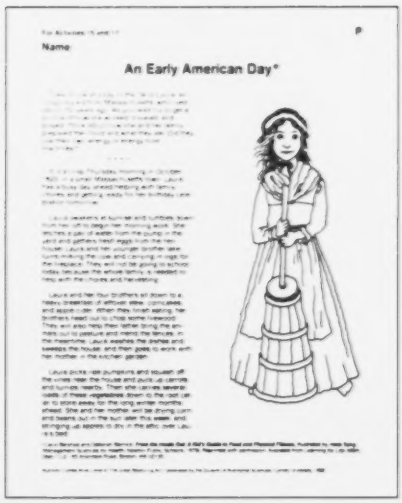
- ***Songs from the Iroquois Longhouse***
- ***Honor Your Partner***
- ***Music for Movement Exploration***

Or use other records or cassettes with music and instructions for these dances or any other similar forms of dance.

Ask the physical education teacher to teach students these dances or teach them yourself.

Collect books on early American life (Resources, Section 3) (optional).

Copy the story "An Early American Day" (story sheets P) for each student. (Save story sheets P for Activity 17.)



Name

An Early American Day*

Are You a "Super Sitter"?

With the development of convenience foods, handy electrical appliances, speedy methods of transportation, and other time-saving devices, most people today have much more available free time than their ancestors did.

Ask students to tell how they usually spend their free time. Write their responses on the board. Then discuss which of these free-time activities require a lot of personal energy expenditure. Compare these activities to ones that require very little personal energy expenditure.

If most class members spend their free time being "super sitters," have them think of more active things they could do and list them on the board.

(continued)

Lifetimes Long Ago

Distribute copies of story sheets P to each student. After students read the story, discuss differences between how they spend their time and how the young colonial girl spent her time.

Questions for conversation:

—What hard physical work did Laura do?

—What is the hardest work or activity you do in a day?

—What machines or appliances do you have today that would make any of Laura's chores easier?

—What did Laura do in her free time?

—How do you spend your free time?

Children today have many more choices about how to spend their free time than children did hundreds of years ago. They also do not expend as much personal energy in their everyday activities. To compensate for this decreased energy expenditure, encourage students to choose free-time activities that keep their bodies on the move. Collect story sheets P for use in Activity 17.

Dance Your Time Away

The early settlers and Native Americans liked to dance for fun and in celebration. Many people today also like to dance. They dance alone, in pairs, or in groups. Have students think of different places where people dance. An exercise studio, stage, gym, home, and sidewalk are all possible answers.

Have the physical education teacher teach students at least one Native American dance and folk dance and one aerobic or other modern form of dance, using the suggested records. Have students demonstrate the dances they learned in class or for an assembly program. If they are familiar with other dances, such as break dance, ballet, tap, or jazz, let them demonstrate these skills. Encourage students to combine some of the dance skills they learned to create a new and unusual dance.

Remind them that there are many other exercises they can do besides dancing in their free time. Emphasize that any activity that involves moving many muscles will increase their energy expenditure and promote physical fitness.

Additional Activities

Field Trip

Visit a dance studio, health club, or exercise class. Have students interview some of the participants to find out why and how often they exercise. Or invite a professional athlete or high school student with special training in aerobic dancing or gymnastics to give an exercise demonstration for the class. Have students write reports or stories about what they saw and learned.

Dance Mini-Marathon

Hold a dance "mini-marathon" as a fund raiser or encourage students to participate in one on their own.

Research Report

Have students research the history of lacrosse using an encyclopedia or similar resource. Have them write reports on what they learned. If possible, ask the physical education teacher to teach the class the fundamentals of this Native American sport.

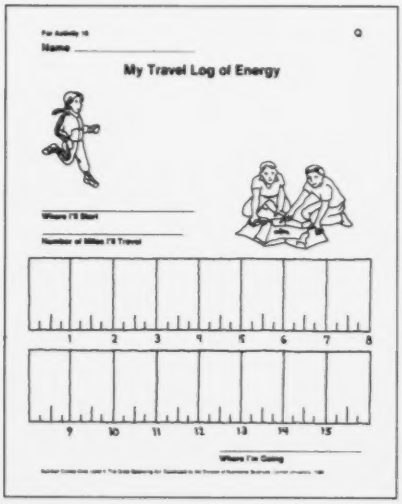
Expending Energy

Advance Preparation

Obtain one copy of a New York State map and one of your local town or county.

Review information on improvisations (Appendix 3).

Copy work sheet Q for each student.



Minus Machines

Have students imagine they are living in a house that has no electricity, gas, running water, or central heating. There are trees and a stream in their backyard and a small grocery store about five miles away. They do not have a car, but there are bicycles in the garage and a wood stove in the basement. Discuss how living under these circumstances would affect their daily energy expenditure. Focus on

—how they will cook their food and prevent it from spoiling.

—how they will heat their house and stay warm.

—how they will wash and clean dishes, clothing, and their bodies.

Follow up the discussion by having groups of six or seven students do an improvisation on how they would manage this situation. The key point of this activity is that even simple, everyday activities such as shopping, cooking, or taking a bath require a great deal of personal energy expenditure when machine energy is not available.

The Energy Crisis

Tell students to imagine there is a shortage of gasoline for cars and buses in your area. Have them think of ways people in the community

(continued)

could help conserve this energy and list their ideas on the board. Organizing car pools, limiting the number of miles a person could drive a car, walking or riding a bicycle instead of driving, and encouraging the use of more gasoline-efficient vehicles are all possible suggestions.

Although there is not a real shortage now, many Americans believe that our supplies of natural fuels such as gasoline, oil, and coal are being depleted. They think people should try to conserve natural fuels to help prevent an energy shortage in the future.

Encourage students to share their energy-conservation ideas with friends and family. Stress that using more personal energy to travel is the best way they can help conserve natural fuels. It will also help keep their bodies in energy balance and improve their level of physical fitness.

A Travel Log of Energy

Have students think of a place they would like to visit such as a park, museum, or nearby city that is at least ten miles away from the school. Have them locate it on the New York State map. Help students determine the distance to their chosen destination using the scale of miles on the map. Distribute copies of work sheet Q and have students write this information in the blanks provided.

Next, help students measure one-mile routes in the school, gym, or on the playground that they could fast-walk or jog. An older family member or friend could help students measure routes from their house to the school, a supermarket, a best friend's house, a church, or a temple that they could walk, jog, or bike. Or students could estimate the number of miles they travel on any route by recording the time it takes them to complete it. For example, one mile is approximately equivalent to

—ten minutes of biking.

—fifteen minutes of running.

—twenty minutes of fast-paced walking.

—twenty-five minutes of regular walking.

Have students record on their travel log the miles they travel using their own energy. They should travel their routes until their total mileage equals the distance to their chosen destination.

Cooking Then and Now

Advance Preparation

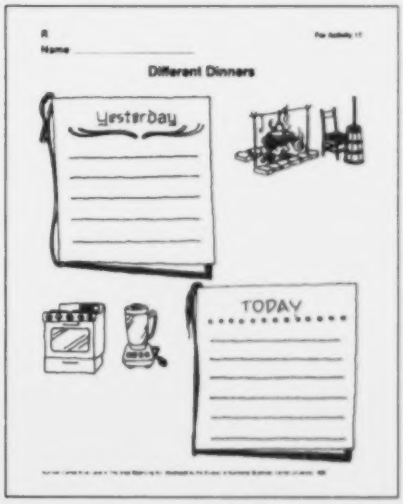
Obtain

Any editions of popular cookbooks with recipes that are at least fifty years old such as ***The Colonial Cookbook*** or ***The Early American Cookbook*** (Resources, Section 3).

Any contemporary cookbooks of your choice such as ***The Joy of Cooking*** or ***The Better Homes and Gardens Cookbook*** (Resources, Section 3).

Distribute copies of story sheets P.

Copy work sheet R and story sheet S for each student.



Foods Our Ancestors Ate

Have students read story P again. Tell them to write down different foods that Laura and her family grew and ate. Discuss how these foods are similar to or different from the foods they eat today.

Questions for conversation:

—What foods do you eat today that were not available long ago?

—Did Laura eat as many different foods in one day as you do?

—What time of the day did Laura's family eat their biggest meal?

—Why do you think this was so?

—When do you usually eat your biggest meal? Why?

—Does the time you eat your biggest meal have any relationship to your body's need for energy?

—Do you expend as much personal energy obtaining and preparing your meals as Laura did?

Distribute copies of work sheet R. Have students write names of foods a child long ago might have eaten for dinner under "Yesterday" and names of foods they would eat for dinner under "Today." Have them turn the work sheet over and write a short sentence for each item on the menus describing how it might have been obtained and prepared. Discuss which menu would require more personal energy expenditure to prepare and why.

Recipe Research

Have each student look up at least one recipe from a cookbook with old recipes. Or have the student ask an older person such as a grandparent for a recipe that is at least fifty years old. Have students find out all the information they can about their recipe and write it on an index card as shown in the diagram below.

Have students compare recipes they collect with ones found in modern cookbooks.

Discuss the following questions:

—Which recipes list more accurate measurements?

—What equipment does each recipe require?

(continued)

FRONT

Recipe for: _____

Collected from: _____

Age of Recipe: _____

This recipe was collected by: _____

Date: _____

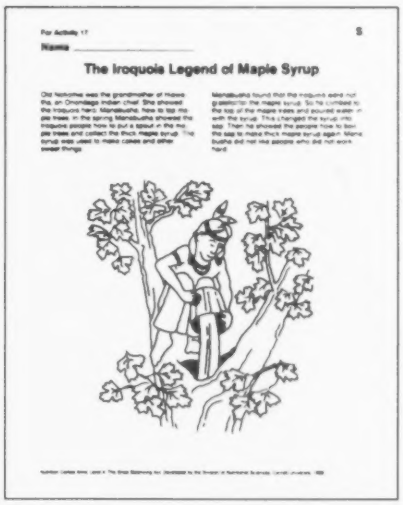
BACK

Ingredients: **Directions:**

—Which recipes require more human energy to prepare?

—Are ingredients home-grown or purchased at a store?

Compile a class cookbook with the recipes students collect. The cookbook might include all old recipes or old ones along with their more modern versions.



The Iroquois Legend of Maple Syrup

Chicken Pie

Cut up your chicken, parboil it, and season it in the pot. Take up the meat, put in a flour thickening, and scald the gravy. Make the crust of sour milk made sweet with saleratus. Cream is preferable to sour milk, if you have it. Put in a piece of butter or lard the size of an egg. Take a large tin pan, line it with the crust, put in your meat, and pour in the gravy from the pot. Make it nearly full, cover it over with crust, and leave a vent. Bake in a moderate oven 2 hours or 2 1/2.

Legendary Food

Read the legend of maple syrup on story sheet S to the class, or have students read it individually. Explain that stories Native Americans told to describe the world around them are now considered legends. Legends might explain how certain foods were discovered or how different plants and animals got their names. They can also teach moral lessons.

Have students write their own legends about the origin of a food they have today that was not available 200 years ago. Their legends should explain how and where the food was discovered and how it is prepared for human consumption. Remind students that legends do not have to be historically accurate. Have students share their food legends with the class. Discuss the amount of human energy needed to prepare their foods.

Additional Activities

Make Bread

Make homemade bread in class using the recipe in Appendix 5. Contrast the amount of personal energy expended making bread from scratch with the amount expended getting bread from a store.

Invite a Guest

Invite an older person in to talk about what life was like when he or she was a child. Ask the guest to describe the physical activities engaged in and foods eaten in his or her youth. Have students write reports on what they learned.

Museum Visit

Visit a local museum to learn how ways of life have changed in farming, homemaking, and retailing. The Farmer's Museum in Cooperstown, the New York State Museum in Albany, the Museum of Natural History in New York City, or Mumford Village in Mumford, New York, are some possible choices.

Evaluation

Advance Preparation

Review material on improvisational drama (see Appendix 3).

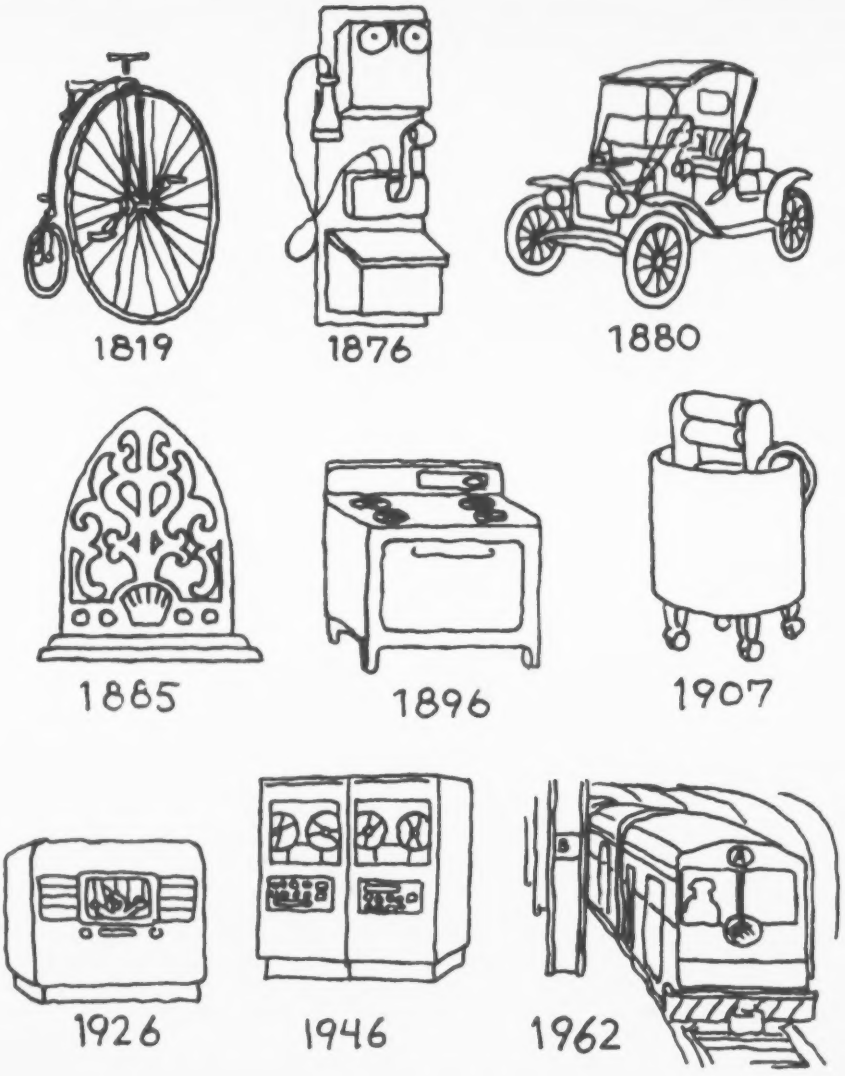
Our Changing Ways

Have students do improvisations of a typical day for a colonial, Native American, and modern-day family. Tell them to incorporate all they have learned about the lifestyles of these people in their improvisations. A dinner scene improvisation is a good choice because it allows students to depict the food the family members ate and how much personal energy was expended preparing the food.

Energy-Saving Time Line

Discuss the technological changes that have occurred during the last two hundred years that have decreased the need for human energy expenditure in everyday activities. Have students make a list of modern conveniences, such as cars, ovens, and electric can openers, that help save their personal energy. Have them use an encyclopedia or similar resource to find out when these items were invented.

Record these advances in technology on a large time line on the wall. Students can draw pictures of the various inventions to attach to the time line. Discuss how energy-saving devices affect a person's ability to stay in energy balance. Have students think of ways people today can compensate for their decreased daily energy expenditure.



Additional Activities

Time Line

Extend the time line two hundred years into the future. Have students think of and describe additional advances in technology that would further decrease the need for human energy expenditure.

Bulletin Board Display

Have students bring in articles, headlines, and pictures from newspapers or magazines that illustrate how people might expend more energy in their daily lives. Arrange these on a bulletin board under the title "Add Extra Energy: Read All About It!"

70

Appendix 1

Cornell Cooperative Extension

ALBANY
518-765-3550

Cooperative Extension
Albany County Resources
Development Center
Martin Road, R.D. 2, Box 131
Voorheesville, NY 12186

ALLEGANY
716-268-7644

Cooperative Extension
County Rd. 48
R.D. 1, Box 226
Belmont, NY 14813

BROOME
607-772-8953

Cooperative Extension
Farm, Home and 4-H Center
840 Front Street
Binghamton, NY 13905

CATTARAUGUS
716-699-2377

Cooperative Extension
Cooperative Extension Center
Parkside Drive
Ellicottville, NY 14731

CAYUGA
315-255-1183

Cooperative Extension
Farm, Home and 4-H Center
248 Grant Avenue
Auburn, NY 13021

CHAUTAUQUA
716-664-9502

Cooperative Extension
Chautauqua County Agricultural Center
R.D. 2
Turner Road, Box 341 A
Jamestown, NY 14701-9608

CHEMUNG
607-734-4453

Cooperative Extension
425 Pennsylvania Ave.
Elmira, NY 14904

CHENANGO
607-334-2634

Cooperative Extension
Farm, Home and 4-H Center
99 North Broad Street
Norwich, NY 13815

CLINTON
518-561-7450

Cooperative Extension
Old Court House Building
Margaret Street
Plattsburgh, NY 12901

COLUMBIA
518-828-3346

Cooperative Extension
Extension Center
Route 66, R.D. #1
Hudson, NY 12534

CORTLAND
607-753-5077

Cooperative Extension
County Office Building
60 Central Avenue
P.O. Box 5590
Cortland, NY 13045

DELAWARE
607-865-6531

Cooperative Extension
P.O. Box 184, NYS Rt. 10
Hamden, NY 13782

DUTCHESS
914-677-5061

Cooperative Extension
P.O. Box 259, Rt. 44
Millbrook, NY 12545

ERIE
716-652-1170

Cooperative Extension
Cooperative Extension Center
21 South Grove Street
East Aurora, NY 14052

ESSEX
518-962-8241

Cooperative Extension
Agricultural Center
Sisco Street
Westport, NY 12993

FRANKLIN
518-483-6767

Cooperative Extension
Cooperative Extension Headquarters
11 Brewster Street
Malone, NY 12953

FULTON
518-765-6441

Cooperative Extension
57 East Fulton Street
Gloversville, NY 12078

GENESEE
716-343-3040

Cooperative Extension
Cooperative Extension Center
420 East Main Street
Batavia, NY 14020

GREENE
518-622-9820

Cooperative Extension
Extension Center
HCR #3, Box 906
Cairo, NY 12413

HAMILTON
518-548-6191

Cooperative Extension
P.O. Box 112 (Courthouse)
Lake Pleasant, NY 12108

HERKIMER
315-866-7920

Cooperative Extension
107 Court St.
Herkimer, NY 13350

JEFFERSON
315-788-8450

Cooperative Extension
223 J.B. Wise Place
Watertown, NY 13601

LEWIS
315-376-6551

Cooperative Extension
Post Office Box 72
5229 Dayan St.
Lowville, NY 13367

LIVINGSTON
716-658-2131

Cooperative Extension
158 South Main Street
Mount Morris, NY 14510

MADISON
315-684-3001

Cooperative Extension
Farm and Home Center
Eaton Street, P.O. Box T
Morrisville, NY 13408

MONROE
716-461-1000

Cooperative Extension
Cooperative Extension Center
249 Highland Avenue
Rochester, NY 14620

MONTGOMERY
518-853-3471

Cooperative Extension
Old Court House
Fonda, NY 12068

NASSAU
516-454-0900

Cooperative Extension
Plainview Complex—Bldg. J.
1425 Old Country Road
Plainview, NY 11803

NIAGARA
716-433-6773

Cooperative Extension
Farm and Home Center
4487 Lake Avenue
Lockport, NY 14094

ONEIDA
315-736-3394

Cooperative Extension
R.R. #1, Box 126
2nd Street
Oriskany, NY 13424-9998

ONONDAGA
315-424-9485

Cooperative Extension
Cooperative Extension Center
1050 West Genesee Street
Syracuse, NY 13204

ONTARIO 716-394-3977	Cooperative Extension Cooperative Extension Center 480 North Main Street Canandaigua, NY 14424
ORANGE 914-343-5979	Cooperative Extension Farm and Home Center 239 Wisner Avenue Middletown, NY 10940
ORLEANS 716-589-5561	Cooperative Extension P.O. Box 150 20 S. Main St. Albion, NY 14411
OSWEGO 315-963-7286	Cooperative Extension Cooperative Extension Headquarters Main Street Mexico, NY 13114
OTSEGO 607-547-2536	Cooperative Extension 123 Lake Street Cooperstown, NY 13326
PUTNAM 914-628-0454	Cooperative Extension 179 East Lake Boulevard Mahopac, NY 10541
RENSSELAER 518-270-4000	Cooperative Extension County Court House Congress and 2nd Sts. Troy, NY 12180
ROCKLAND 914-638-5500	Cooperative Extension 62 Old Middletown Road New City, NY 10956-2737
ST. LAWRENCE 315-379-2311	Cooperative Extension University Shopping Center 125 Main St. East Canton, NY 13617
SARATOGA 518-885-8995	Cooperative Extension 50 West High Street Ballston Spa, NY 12020
SCHENECTADY 518-372-1622	Cooperative Extension 615 State St. Schenectady, NY 12305
SCHOHARIE 518-234-4303	Cooperative Extension 41 South Grand Street Cobleskill, NY 12043
SCHUYLER 607-535-7466	Cooperative Extension Rural-Urban Center 208 Broadway Montour Falls, NY 14865
SENECA 315-539-9254	Cooperative Extension Farm, Home and 4-H Center 321 East Williams Street Waterloo, NY 13165
STEUBEN 607-776-7666	Cooperative Extension County Office Building 119 East Steuben St. Bath, NY 14810
SUFFOLK 516-727-7850	Cooperative Extension 246 Griffing Avenue Riverhead, NY 11901
SULLIVAN 914-292-5250	Cooperative Extension P.O. Box 191 (59 N. Main St.) Liberty, NY 12754
TIOGA 607-687-4020	Cooperative Extension 56 Main Street Owego, NY 13827
TOMPKINS 607-272-2292	Cooperative Extension Cooperative Extension Center 225 South Fulton Street Ithaca, NY 14850
ULSTER 914-338-3494	Cooperative Extension Extension Headquarters P.O. Box 3545 (74 John St.) Kingston, NY 12401
WARREN 518-623-3291	Cooperative Extension Schroon River Road HCR 02, Box 23B Warrensburg, NY 12885
WASHINGTON 518-747-2861	Cooperative Extension County Office Building Annex Lower Main Street Hudson Falls, NY 12839
WAYNE 315-483-6918	Cooperative Extension P.O. Box 217 (County Rd. 143 and Rt. 14N) Alton, NY 14413
WESTCHESTER 914-682-3074	Cooperative Extension 214 Central Avenue White Plains, NY 10606
WYOMING 716-786-2251	Cooperative Extension 401 North Main Street Warsaw, NY 14569
YATES 315-536-3381	Cooperative Extension County Office Building 110 Court Street Penn Yan, NY 14527

New York Offices of Cornell Cooperative Extension, including Expanded Food and Nutrition Program sites (EFNEP):

Administrative Office 213-340-2900	Cornell Cooperative Extension 15 East 26th St., 5th Floor New York, NY 10010-11565
Brooklyn Center 718-237-0920	100 Clinton Street, 2nd Floor Brooklyn, NY 11201-4203
Bedford Stuyvesant EFNEP 212-783-2722	Stark Bldg., 5th Floor 1360 Fulton Street Brooklyn, NY 11216-2606
Bronx EFNEP 212-583-7770	2021 Grand Concourse, Room 602 Bronx, NY 10453-4317
Brownsville EFNEP 718-385-0233	444 Hopkinson Ave., 1st Floor Brooklyn, NY 11212-1542
Lower East Side EFNEP 212-260-6300	107 Suffolk, Rm. 210 New York, NY 10002-3305
Queens EFNEP 212-526-3490	161-10 Jamaica Avenue, Room 216 Jamaica, NY 11432-6149
Staten Island EFNEP 718-447-2600	28 Bay Street Staten Island, NY 10301-2511
Upper Manhattan EFNEP 212-923-2400	4250 Broadway, Room 7 New York, NY 10033-3708

Appendix 2

Dairy Council Offices in New York State

Dairy, Food, and Nutrition Council

Syracuse (315) 475-2721,
Headquarters
(counties served: Cayuga, Cortland, Hamilton, Herkimer, Jefferson, Lewis, Madison, Oneida, Onondaga, Oswego, Seneca, St. Lawrence)
472 South Salina Street, Suite 101
Syracuse, NY 13202-2401

Arkport (607) 295-7222
(counties served: Allegany, Cattaraugus, Steuben)
R.D. #1, Box 220A
Ellis Hill Road
Arkport, NY 14807

Binghamton (607) 724-7598
(counties served: Broome, Chemung, Chenango, Delaware, Otsego, Schuyler, Tioga, Tompkins, Yates)
834 Front Street
Binghamton, NY 13905

Latham (518) 785-5441
(counties served: Albany, Clinton, Columbia, Essex, Franklin, Fulton, Greene, Montgomery, Rensselaer, Saratoga, Schenectady, Schoharie, Warren, Washington)
Commerce Building
678 Troy-Schenectady Road
Latham, NY 12110

Poughkeepsie (914) 452-5630
(counties served: Dutchess, Orange, Putnam, Rockland, Sullivan, Ulster)
316 Main Mall
Poughkeepsie, NY 12601

Dairy Council of Niagara Frontier Area (716) 634-1080
(counties served: Erie, Genesee, Niagara, Orleans, Wyoming)
2451 Wehrle Drive
Buffalo, NY 14221

Dairy Council of Metropolitan New York (212) 682-7961
(counties/boroughs served: Bronx, Brooklyn, Manhattan, Queens, Staten Island, Nassau, Suffolk, Westchester)
60 East 42nd Street, Room 2446
New York, NY 10165

Dairy Council of Rochester Area
(716) 461-2880
(counties served: Livingston, Wayne, Monroe, Ontario)
Carnegie Place
247 No. Goodman
Rochester, NY 14607

Dairy and Nutrition Council, Mideast
(814) 868-1714
(county served: Chautauqua)
Park Place, Suite 11
1545 W. 38th Street
Erie, PA 16508

Health and Nutrition Regional Network

Coordinator	Geographic Area Served
Regional Health and Nutrition Coordinator St. Lawrence-Lewis County BOCES A. A. Kingston Middle School Potsdam, NY 13676	Region I: Counties of Allegany, Cattaraugus, Cayuga, Chautauqua, Clinton, Erie, Essex, Franklin, Genesee, Hamilton, Herkimer, Jefferson, Lewis, Livingston, Madison, Monroe, Niagara, Oneida, Onondaga, Ontario, Orleans, Oswego, St. Lawrence, Seneca, Wayne, Wyoming, Yates
Regional Health and Nutrition Coordinator Ulster County BOCES 175 Route 32 North New Paltz, NY 12561	Region II: Counties of Albany, Broome, Chemung, Chenango, Columbia, Cortland, Delaware, Dutchess, Fulton, Greene, Montgomery, Orange, Otsego, Putnam, Rensselaer, Rockland, Saratoga, Schenectady, Schoharie, Schuyler, Steuben, Sullivan, Tioga, Tompkins, Ulster, Warren, Washington, Westchester
Regional Health and Nutrition Coordinator Suffolk 3 BOCES Long Acre School Sarina Drive Commack, NY 11725	Region III: Counties of Nassau and Suffolk and New York City (five boroughs)

Improvisations*

Improvisational drama can encourage students to act out or create an event that relates to the subject matter in this unit. Improvisations are useful instructional tools because they

- provide students with an opportunity to use their bodies, voices, and emotions to express themselves.
- encourage students to integrate and apply factual information they learn.
- do not require props or costumes although chairs, benches, and simple costume parts can be assembled if desired.

As the teacher, you both are the catalyst and director of the improvisational process. Before beginning any improvisational work, you should

- prepare more improvisational scenes than you might use.
- emphasize to students that there is no right or wrong improvisational work.
- discuss and review scenes with each group of students as they sit together in a circle.
- tell students **who** they are so they can establish a character; **where** they are so they can act as that character would; and **what** they should be doing. Make sure your directions are simple, clear, and concise.

As the director you need to

- visit groups of students while they are discussing an improvisation so you can contribute ideas and suggestions if necessary.
- call on different groups to present their improvisations individually. Have the rest of the class tell what they liked or did not understand about each group's improvisation.
- prompt the actors if necessary, or give them instructions for changing the direction or pace of a scene, or enter yourself as a new character in the improvisation.
- stop an improvisation if students become silly. Improvisations can be serious, imaginative, creative, or funny but they are never silly.
- end any improvisation if it falls apart or becomes redundant.

These are some of the essential principles of educational drama. Additional information can be found in the section on using ***The Great Balancing Act*** preceding Section 1 of this book or obtained from any acting school or youth drama organization.

Although specific improvisations are included in each section of this unit feel free to create and use your own ideas.

*Developed by Ruth Davis, Supervisor, Center for the Expressive Arts, Ithaca Youth Bureau, Ithaca, New York.

The AAHPERD Fitness Test

The American Alliance for Health, Physical Education, Recreation, and Dance has designed four simple tests to try in school or at home that test a child's level of physical fitness.

Have students complete all the tests. Then compare their results with the national averages for their age group, listed in the chart on the next page.

1. Modified Sit-Ups

Objective:

To evaluate abdominal muscle strength and endurance

Equipment needed:

A mat or soft floor
A watch with a second hand

Procedure:

1. The student lies on the floor or mat with knees bent, feet flat on the floor, and heels 12 to 18 inches from his/her buttocks. Arms are crossed on the chest with hands on the opposite shoulders. A partner holds the student's feet on the floor.
2. Given a signal, the student curls up to the sitting position, making sure to maintain arm and chin contact with the chest.
3. The sit-up is completed when elbows touch the thighs. The student then rolls down until his/her mid-back touches the floor.

Scoring:

The student will do as many sit-ups as he/she can in 60 seconds.

2. One-Mile Run

Objective:

To measure the maximum capacity and endurance of the heart-lung system

Equipment needed:

A premeasured one-mile track or course
A watch with a second hand

Procedure:

1. As a warm-up, the student jogs in place for 3 to 5 minutes.
2. Then he/she runs and, if necessary, runs/walks for a distance of one mile.
3. The student walks 3 to 5 minutes after the test to cool down.

Scoring:

The time required for the student to run/walk one mile.

3. Sit and Reach

Objective:

To evaluate flexibility of the lower back and hamstring muscles

Equipment needed:

A box or platform 12 inches high
A yardstick or meterstick

Procedure:

1. As a warm-up, the student does several slow, gentle stretches.
2. The student removes his/her shoes and sits on the floor with feet shoulder width apart and flat against the 12-inch surface.
3. Place the yardstick or meterstick on top of the surface. Have the 9-inch mark even with the student's heels so the lowest numbers are extending toward the student.
4. The student reaches directly forward, palms down, along the yardstick four times. On the fourth try he/she holds the position of maximum reach for 1 second.

Scoring:

Record the most distant point reached on the fourth trial with the fingertips of both hands.

4. Standing Long Jump

Objective:

To measure explosive power

Equipment needed:

A tape measure
A role of masking tape

Procedure:

1. Mark a takeoff line with a strip of masking tape.
2. The student stands behind the takeoff line with his/her feet several inches apart.
3. The student jumps as far as he/she can; allow three trials.
4. Mark the spot where he/she landed with a strip of masking tape.
5. Measure the distance from the takeoff line to the point where the heels touched the ground.

Scoring:

Record the best of the three trials in feet and inches or in centimeters.

(continued)

How Do Your Students Compare to Average?

Age	8	9	10
Modified Sit-Ups	30	31	33
One-Mile Run	11:30	11:00	10:13
Sit and Reach	10″ (26 cm.)	10″ (26 cm.)	10″ (26 cm.)
Standing Long Jump	4′1″ (125 cm.)	4′5″ (135 cm.)	4′7″ (140 cm.)

For more information contact: American Alliance for Health, Physical Education, Recreation, and Dance, 1900 Association Drive, Reston, VA 22091.

Two-Hour Bread*

Ingredients

1 1/2 cups warm water
4 1/2 teaspoons dry yeast
1/4 cup honey or molasses
4 1/2 teaspoons oil
1 1/4 cups whole wheat flour
2 cups all-purpose flour
1/2 teaspoon salt
1/2 cup powdered milk

Equipment

1 large bowl
Measuring cups and spoons
Dish towel
1 loaf pan

1. Preheat oven to 375 degrees F and grease one loaf pan.
2. In a large bowl mix warm water, yeast, and honey or molasses. Let sit 5 minutes.
3. Add oil to yeast mixture.
4. Mix in whole wheat flour, all-purpose flour, salt, and powdered milk.
5. Cover and let rise in a warm place for 15 minutes.
6. Sprinkle flour on table and hands.
7. Knead well for 10 minutes.
8. Place dough in greased loaf pan.
9. Let rise 30 minutes in a warm place.
10. Bake approximately 40 to 50 minutes.

*From Christine Olson and Jill Randell, **Early Childhood Nutrition Program,** 1979.

The Great Balancing Act

Level 4

Work Sheets, Information Sheets, Story, Letters to Parents
New York State Revised Edition

NUTRITION COMES ALIVE

SP 028 384

Nutrition Comes Alive

Level 4
The Great Balancing Act

Work Sheets, Information Sheets, Story, Letters to Parents

A Revision by Laurie Waldron

Based on materials developed by Martha L. Plass

Division of Nutritional Sciences, a division of the New York State College of Human Ecology and the New York State College of Agriculture and Life Sciences, Cornell University, Ithaca, New York 14853. 1986.

Work Sheets, Information Sheets, Story, Letters to Parents

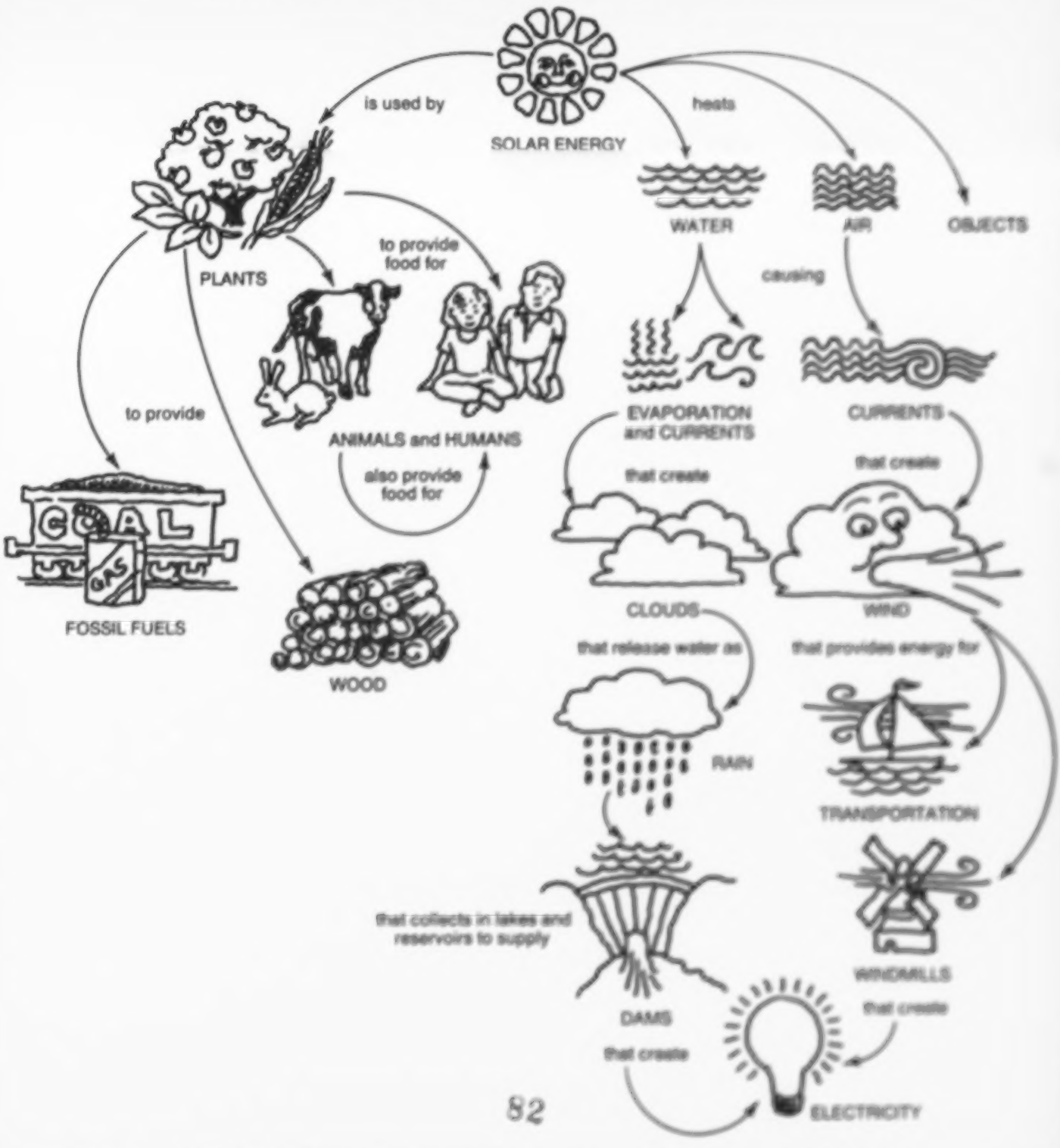
Work Sheets, Information Sheets, Story, Letters to Parents	Letter Code
For Section 1	
Where Our Energy Comes From	A
Count Your Calories	B
Which Has More?	C
Letter to Parents	D
The Energy Quiz	E
Check What You Know	F
For Section 2	
Improvisation	G
Find Out Your Own REN	H
Balancing Energy	I
Calorie Values	J
Activities and Calories	K
Letter to Parents	L
Solving Energy Problems	M
How You Spend Your Energy	N
For Section 3	
Transportation Teasers	O
An Early American Day	P
My Travel Log of Energy	Q
Different Dinners	R
The Iroquois Legend of Maple Syrup	S

For Activity 1

A

Name _____

Where Our Energy Comes From



Nutrition Comes Alive, Level 4, The Great Balancing Act. Developed by the Division of Nutritional Sciences, Cornell University, 1998.

B

For Activity 4

Name _____

Count Your Calories

1. Add up the Calories in the following foods, which might make up a dinner menu.

Spaghetti with meatballs	332
Small tossed salad	145
1 slice bread	85
2 slices pineapple	90
1 glass whole milk	+ 160

Answer: _____
Calories

2. How many Calories would this breakfast provide you with?

2 slices peanut butter toast	257
1/2 sliced banana	45
1 glass orange juice	10
1 glass skim milk	+ 90

Answer: _____
Calories

3. Assume your body can use 2400 Calories in one day. If you have the dinner in Question 1 and the breakfast in Question 2, how many Calories should your lunch provide?

_____ Calories for dinner

\+ _____ Calories for breakfast

_____ Calories in breakfast and dinner

2400 Calories you need each day

\- _____ Calories in breakfast and dinner

_____ Calories for lunch

Answer: _____
Calories for lunch

4. What foods might you eat for lunch to supply the Calories you need?

List some choices here:

a _____ b _____

c _____ d _____

Nutrition Comes Alive, Level 4, The Great Balancing Act. Developed by the Division of Nutritional Sciences, Cornell University, 1986.

For Activity 5

C

Name _____

Which Has More?

Which of the foods in each pair has more Calories? Circle the correct answer and give the reasons why on the line beside each pair. (Remember that foods with lots of fat or sugar are usually high in Calories.)

1

_____

_____

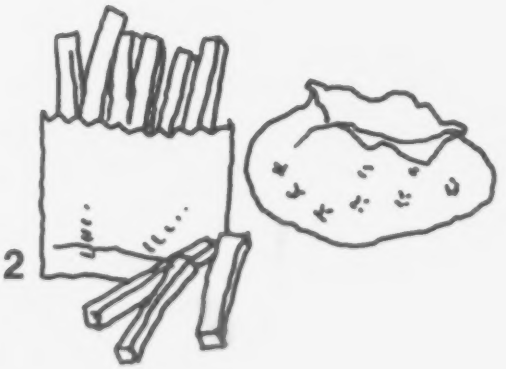
_____

_____

_____

_____

2



3

_____

_____

_____

(continued)

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C

4

5

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Dear Parent,

In class we have been exploring the number of Calories in foods contributed by each of the three energy nutrients—protein, carbohydrate, and fat. We have also learned that foods that are high in fat usually are high in Calories.

You have probably heard some of the reports in the news over the last ten years that link high-fat, high-cholesterol diets to the development of cardiovascular disease. Many other factors, both lifestyle and hereditary, might also affect the development of this disease. Since the relationship is strongest for high dietary fat, cutting down the amount of fat in your family's diet may be a good idea. Cutting down on fat can also make weight control or weight loss easier.

Remember that fat is an essential dietary nutrient that the body uses for energy and in the production of hormones and cell membranes. Therefore, severely restricting fat intake is not advisable.

Cut the Fat

Here are some easy ways to cut down on the amount of fat and cholesterol in your diet.*

- Try fruit for dessert instead of pie, cake, cookies, chocolate, or ice cream.
- Drink skim or low-fat milk instead of whole milk. Use it in cooking too. Buy low-fat instead of full-fat cheeses. For example, try part skim mozzarella instead of mozzarella made from whole milk.
- Use low-fat milk in coffee or tea instead of cream or nondairy substitutes.
- Substitute low-fat yogurt or cottage cheese for sour cream or mayonnaise in many recipes.
- Eat plain popcorn or pretzels (preferably unsalted) instead of chips.
- Choose lean meats rather than hot dogs, bologna, sausage, and other fatty meats. Use fish, poultry, and cooked dried peas and beans (such as kidney beans, lentils, chick peas, soybeans, split peas). If cooking hot dogs, boil them before the final cooking and a good portion of the fat will be left in the water.
- When possible, trim all visible fat from meat and remove skin from chicken and turkey before eating.
- Experiment with cutting the butter, margarine, or oil by a third or a half in casseroles or quick breads.
- Switch from frying to broiling, baking, roasting, simmering, or microwave cooking. Avoid choosing fried foods in the supermarket or when eating out.
- Remove all fat from meat drippings before making gravy. (If you harden the fat with ice cubes, you can lift it off the top with a slotted spoon.) Make soup or stew a day ahead, refrigerate, and remove the fat that hardens on the top.
- Substitute lemon juice or vinegar for salad dressing made with oil or mayonnaise.
- Limit consumption of eggs, liver, and other organ meats.

You can use this information at hone to help reinforce your child's learning in the classroom.

*Adapted from the ***Massachusetts Nutrition Resource Center Bulletin,*** Massachusetts Nutrition Resource Center and Frances Stern Nutrition Center, 1980.

(continued)

Queridos Padres:

En clase hemos estado estudiando sobre el número de calorías que se obtienen de cada una de las tres fuentes de energía—proteína, carbohidratos y grasa.

También hemos aprendido que los alimentos con un alto contenido de grasa usualmente tienen muchas calorías. Es probable que ustedes hayan oído, durante los últimos diez años, informes que asocian la dieta que contiene mucha grasa y colesterol con el desarrollo de las enfermedades cardiovasculares. Hay muchos otros factores, entre estos el estilo de vida y el hereditario, que podrían también afectar el desarrollo de esta enfermedad. Por cuanto que la relación es más notable cuando se usan dietas con mucha grasa, sería una buena idea reducir la cantidad de grasa en la dieta de su familia. Esto también les haría más fácil controlar el peso o rebajar.

Recuerden que la grasa es un nutriente esencial en su dieta la cual el cuerpo convierte en energía y usa en la producción de hormonas y células membranosas. Por lo tanto, no es aconsejable restringir mucho el uso de la grasa en su dieta.

Reduzca la Grasa

*A continuación le ofrecemos algunas ideas que le ayudarán a reducir la cantidad de grasa y colesterol en su dieta.**

- Trate de comer frutas para el postre en vez de pastel, bizcocho, galletas dulces, chocolate o mantecado.
- Tome leche desnatada o baja en grasa en vez de leche íntegra. Usela también en los platos que cocina. Compre quesos de bajo contenido en grasa en vez de los regulares. Por ejemplo, trate de usar mozzarella hecho en parte con leche desnatada en vez del que se hace con la leche íntegra.
- Use leche baja en grasa para el café y el té, en vez de crema o substitutos.
- Use yogurt bajo en grasa o requesón, en vez de crema agria o mayonesa en muchas de sus recetas de cocina.
- Coma rosetas de maíz al natural o pretzels (preferiblemente sin sal) en vez de hojuelas de papas (chips).
- Seleccione carnes sin grasa en vez de perros calientes (hot dogs), embutidos, salchichas u otras carnes con mucha grasa. Use pescado, carne de aves y granos secos cocidos, tales como frijoles, lentejas, garbanzos, habichuela soya y guisantes. Cuando cocine perros calientes (hot dogs), hiérvalos bastante antes de prepararlos para servir, ya que una buena porción de la grasa se quedará en el agua.
- Cuando le sea posible, recorte toda la grasa visible en la carne y remueva el pellejo del pollo y el pavo antes de comerlo.
- Experimente reduciendo por un tercio o la mitad de la mantequilla, margarina o aceite que usted usa en sus platos a la cacerola o en panecillos.
- En vez de freír, prepare sus comidas asando, horneando, hirviendo a fuego lento o en hornos micro-ondas. Evite escoger alimentos para freír cuando vaya al supermercado o cuando salga a comer fuera.
- Remueva toda la grasa del líquido de la carne antes de preparar la salsa (gravy). (Si endurece o cuaja la grasa con cubos de hielo, usted podrá removerla fácilmente con una cuchara o tenedor.) Cocine las sopas o guisados el día anterior y podrá remover la grasa que se endurence encima.
- Use jugo de limón o vinagre en el aderezo para sus ensaladas en vez de aceite o mayonesa.
- Limite el consumo de huevos, hígado y otros órganos.

* Adaptado del ***Massachusetts Nutrition Resource Center Bulletin,*** Massachusetts Nutrition Resource Center and Frances Stern Nutrition Center, 1980.

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For Activity 6

E

Name _____

The Energy Quiz

Find out how many Calories are in one serving of each of the foods listed by using the Calories/gram values for all the energy nutrients. (Remember that there are 4 Calories in one gram of carbohydrate and protein and 9 Calories in one gram of fat.)

1. One slice of wheat bread contains:

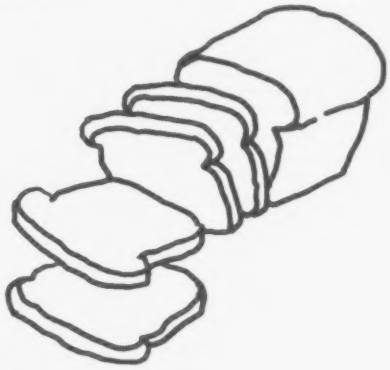
13 g of carbohydrate	2 g of protein	1 g of fat
x _____	x _____	x _____
_____ Cal.	_____ Cal.	_____ Cal.

_____ carbohydrate Calories

_____ protein Calories

\+ _____ fat Calories

_____ TOTAL Calories



2. One cup of whole milk contains:

11 g of carbohydrate	8 g of protein	8 g of fat
x _____	x _____	x _____
_____ Cal.	_____ Cal.	_____ Cal.

_____ carbohydrate Calories

_____ protein Calories

\+ _____ fat Calories

_____ TOTAL Calories

(continued)

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3. One cup of skim milk contains:

11 g of carbohydrate	8 g of protein	1 g of fat
x _____	x _____	x _____
_____ Cal.	_____ Cal.	_____ Cal.

_____ carbohydrate Calories

_____ protein Calories

\+ _____ fat Calories

_____ TOTAL Calories

4. One "Big Mac" contains:

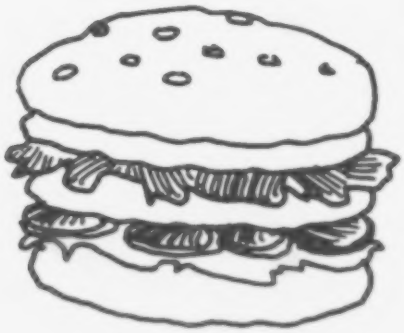
39 g of carbohydrate	26 g of protein	31 g of fat
x _____	x _____	_____
_____ Cal.	_____ Cal.	_____ Cal.

_____ carbohydrate Calories

_____ protein Calories

\+ _____ fat Calories

_____ TOTAL Calories



All finished? Good work!

Now go back and circle the nutrient in each food that contributed the most Calories. What did you learn? _____

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Name _____

Check What You Know

Match the letter of the explanation in Column B that best fits the word or group of words in Column A. Write the letter in the blank. Not all the choices in Column B will be used.

Column A

1. ____ Sun
2. ____ Fat and carbohydrate
3. ____ Food
4. ____ Nutrients
5. ____ Calories
6. ____ Protein
7. ____ Fresh fruits, meats, and vegetables
8. ____ Sugar or sucrose
9. ____ High-fat foods
10. ____ High-carbohydrate foods

Column B

a. A form of carbohydrate found in foods like candy, soft drinks, cereals, and cookies

b. The energy nutrient that your bodies usually use for growth and repair

c. Nutrients that provide your body with most of its energy

d. Nutrient information is not usually listed on a label for these foods

e. A fuel source of automobiles, cars, and buses

f. A nutrient source for both humans and animals

g. The main source of all the earth's energy

h. A measure of the amount of energy in foods

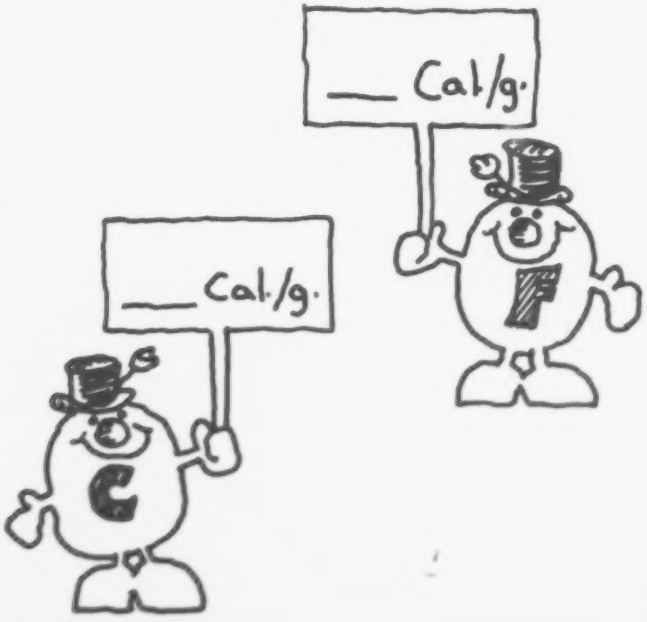
i. Fruits, breads, cereals, and macaroni

j. Margarine, ice cream, fried chicken, french fries

k. Water, vitamins, minerals, fat, carbohydrates, and protein

l. A measure of how much a food weighs

Insert the correct numbers in the signs below.



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Improvisation

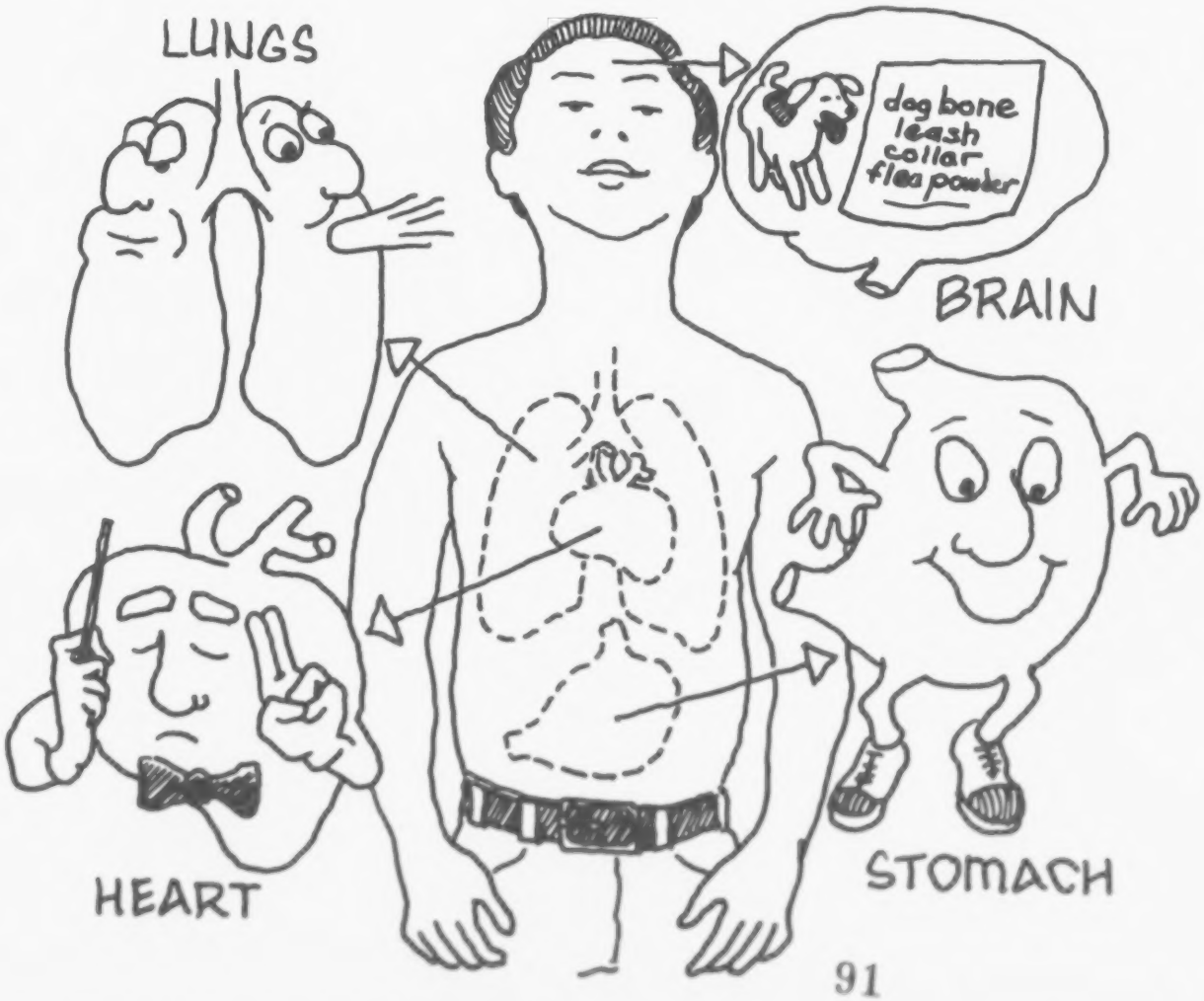
Needed:

One person to play Average Resting Body.

Others to act as the heart, lungs, brain, stomach, bones, and muscles.

One person to serve as a commentator.

Scene: As Average Resting Body rests quietly the commentator inquires what he/she is doing. Average answers that he/she is not doing anything. Then each body part individually appears and acts out what it does, using sound and motion. The body parts might also make a short statement about their important functions. After all the body parts have appeared, Average Resting Body realizes that his/her body is never really at rest but is using energy all the time no matter what he/she appears to be doing.



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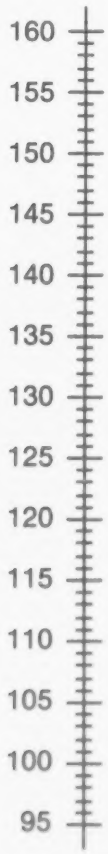
Name _____

Find Out Your Own REN

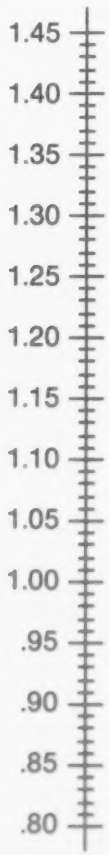
Scale 1

Your height
in centimeters (cm)



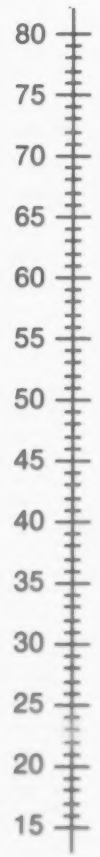
Scale 3

Your surface area
in square meters (m^2)



Scale 2

Your weight in
kilograms (kg)



FORMULA: 44 x _____ **x 24 =** _____

Your Surface Area **Your REN**

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I

For Activity 9

Name _____

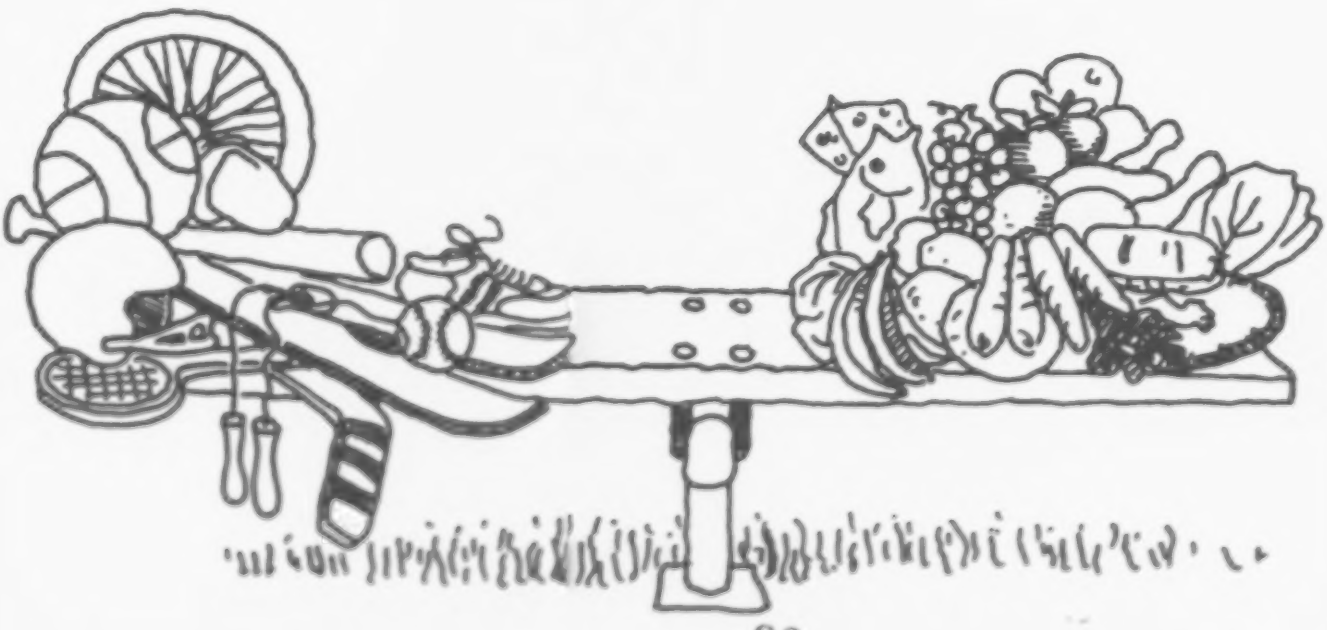
Balancing Energy

Pick two foods from information sheet J that you like and write them in the blanks provided. Write the number of Calories in each food in the box next to it. Now pick one activity from information sheet K that you especially like to do and write it on the blank under "Activity." Write the number of Calories per minute you would use doing that activity.

Now find out how many minutes you would have to do your activity to use up the Calories in each food you picked.

	Foods	Cal.			
1.	_____	☐	= ☐	minutes of _____	Activity
2.	_____	☐	= ☐	minutes of _____	Activity

	Activity	Cal./mir.
3.	_____	☐



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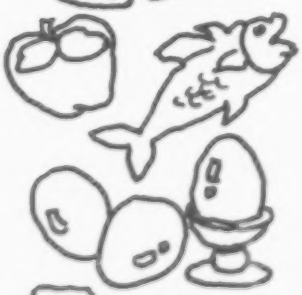
Name _____



Calorie Values

1 cup whole milk = 160

1 cup skim milk = 90

1 cup chocolate milk = 220

1 baked potato = 100

tuna fish sandwich = 280

peanut butter and jelly sandwich = 290

1 bagel = 160

cheeseburger = 310

1 apple = 100

1 slice cheese pizza = 145

2 pancakes with syrup = 265

1 cup orange juice = 120

1 cup spaghetti and meatballs = 330

1 cup chili = 340

1 cup rice with beans = 330

1 cup fruit-flavored yogurt = 230

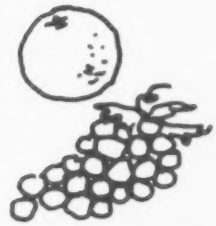
1 bowl of cornflakes with milk = 245

1 scoop vanilla ice cream = 150

2 carrots = 40

1 stalk celery = 5

1 tomato = 40



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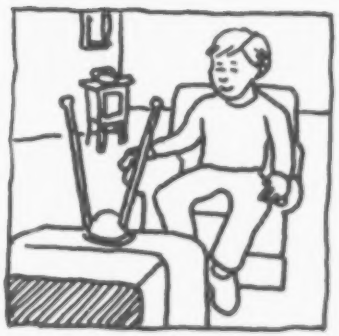
K

For Activities 9 and 13

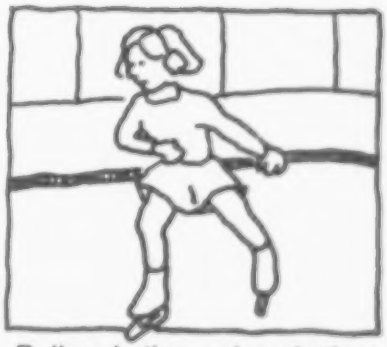
Name _____

Activities and Calories



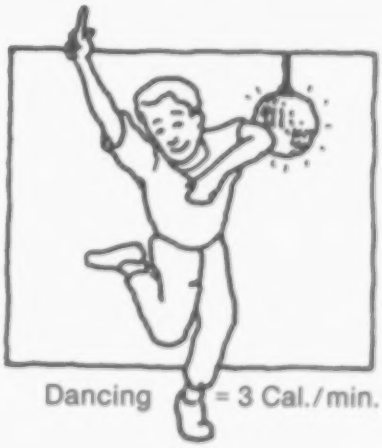
Watching TV = 1 Cal./min.

Bicycling = 3 Cal./min.

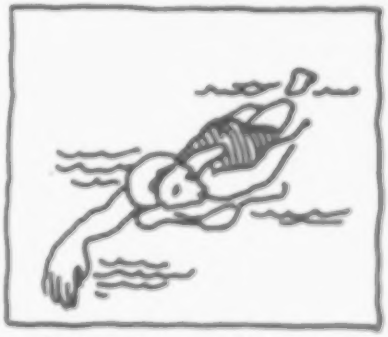


Roller skating or ice skating = 3 Cal./min.

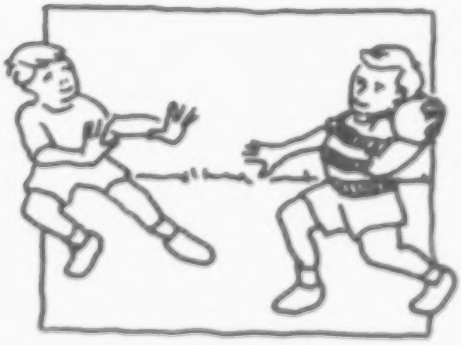
Fast walking = 3 Cal./min.



Dancing = 3 Cal./min.



Swimming = 4 Cal./min.



Dodge ball = 3 Cal./min.

Running = 4 Cal./min.

Climbing up and down stairs = 3 Cal./min.

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Dear Parent,

In class we have been learning about how regular exercise can benefit total physical fitness and overall well-being. Although many adults today are busy getting their bodies in shape, young people are not taking the same interest in fitness. Surveys show that 50 percent of American children are physically unfit.

You can easily gauge your child's level of fitness by simple observation. Carefully watch him/her in action (or inaction) and see how he/she compares to other children in the neighborhood or at school.

- Analyze his or her favorite games and recreational activities. Children who are inactive usually prefer quiet games instead of more lively activities.
- Compare her overall appearance, complexion, and muscle tone to those of classmates and peers. Does she appear healthy?
- Look for sedentary activity patterns. Does he prefer watching television to active, outdoor play? A healthy lifestyle should include a mix of both quiet and active play.

Try to be objective in your observations. If your whole family tends to prefer activities such as reading, watching TV, or using computers rather than playing active sports or games, you might not be aware of your child's lack of activity.

If you find that your child or other family members could use a fitness boost, encourage exercise and activity by:

- Making exercise a part of family outings and social gatherings. Volleyball, touch football, softball, or other team sports involve many people, whereas jumping rope, flying a kite, or tossing a frisbee are more suitable for small groups.
- Starting your own exercise routine and then inviting your child to join you in an exercise class, walk, or jog.
- Incorporating exercise into everyday activities. Climb the stairs instead of waiting for the elevator; walk to work or the store instead of taking the bus; or get off the bus or train a few blocks early and walk the rest of the way home.
- Supporting participation in team or individual sports.
- Joining with other parents to ensure that your child's school physical education program is up to par.

Above all else, project an enthusiastic, positive attitude about fitness and chances are your child, or perhaps the whole family, will be encouraged to adopt a more active lifestyle.

(continued)

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L

Queridos Padres:

En la clase hemos estado aprendiendo como el hacer ejercicios regularmente puede beneficiar su estado de salud y su bienestar físico en general. Pero a pesar de que hoy día muchos adultos se ocupan de mantener sus cuerpos en buena forma, los jóvenes no se están interesando en mantenerse en buen estado físico. Los estudios muestran que el 50% de los niños en hogares norteamericanos se encuentran en mal estado físico.

Usted podrá facilmente evaluar el estado de salud o físico de su niño (o niña) con simplemente observarlo. Vigile cuidadosamente su actividad (o inactividad) y compárelo con otros niños o niñas en su vecindario o en la escuela.

- Analice sus juegos favoritos o actividades recreativas. Los niños quietos o callados, usualmente prefieren juegos pasivos en vez de actividades más animadas y enérgicas.
- Compare su apariencia total, su complexión y el tono de sus músculos con el de sus compañeros de clase o grupo de su misma edad. ¿Parece ella saludable?
- Esté alerta a sus hábitos de actividad sedentaria. ¿Prefiere él ver televisión en vez de jugar al aire libre? Un estilo de vida saludable debe incluir una combinación de juegos pasivos y activos.

Trate de ser objectivo en sus observaciones. Si toda la familia tiende a preferir actividades tales como la lectura, ver televisión o el uso de computadoras en vez de los deportes o juegos enérgicos, entonces usted podría no darse cuenta de la poca actividad en la vida de su niño o niña.

Si usted encuentra que su niño o niña o algún otro miembro de su familia necesita motivación para mejorar su condición física, entonces anímelos a hacer ejercicios físicos y a participar en actividades de la siguiente manera:

- Incluya ejercicios o gimnasia en el programa para las excursiones, giras y reuniones sociales de su familia. Los juegos de volleyball, football, softball o cualquier otro deporte que requiera un equipo, necesita y envuelve muchas personas; mientras que brincar la cuerda, volar cometas o tirar discos (frisbee) son más propios para grupos pequeños.
- Comience su propia rutina de ejercicios o gimnasia y entonces invite a su niño a unirse a usted en una clase de gimnasia, o a caminar, o a trotar.
- Incorpore ejercicio físico a sus actividades diarias. Suba las escaleras en vez de esperar por el ascensor; camine al trabajo o a la tienda en vez de viajar en el autobús; bájese del tren o autobús unas cuantas cuadras antes de llegar a su casa y camine.
- Estimule y apoye la participación en deportes, ya sea en equipos o individual.
- Unase o otros padres para asegurarse que el programa de educación física en la escuela de su niño es satisfactorio.

Sobre todo, demuestre entusiasmo y actitud positiva hacia todo lo relacionado con buena salud y condición física, y lo más probable es que su niño o niña y tal vez toda la familia, se decida a seguir un estilo de vida que incluya más actividad.

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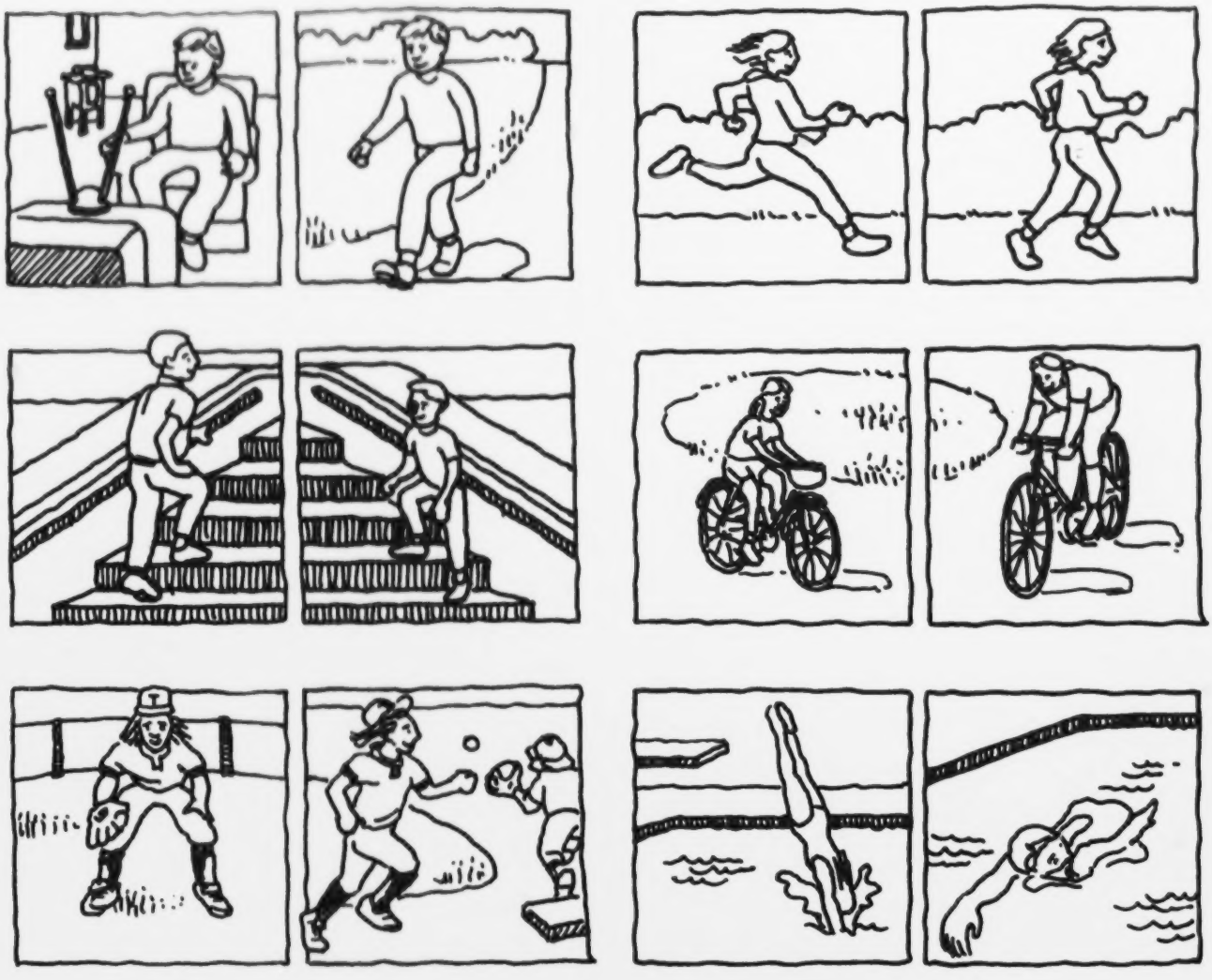
Name _____

Solving Energy Problems

Can you solve these energy problems? Circle the person in each pair who is using the most energy. Remember that the amount of energy used is affected by

1. The number of muscles you move.
2. How long and how hard you move those muscles.
3. How large or small you are.



Think of all the ways that you could expend more energy in your daily life to help you keep fit.

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Name _____

How You Spend Your Energy

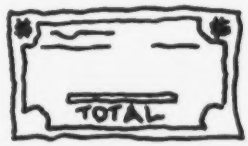
START

1. **Deposit Breakfast**

2. **Withdraw Exercise-Energy**

3. **Deposit Lunch**

4. **Check Out More Exercise**



5. **Sneak a Snack**

6. **Deposit Dinner**

7. _____

_____

_____

\+ _____

_____

Total deposits

8. _____

_____

\+ _____

_____

Total withdrawals

9. _____ **Total Deposits** – _____ **REN** = _____ **Energy left over for activity**

10. _____ **Energy left over for activity** >or = or< _____ **Total withdrawals**

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Name _____

Transportation Teasers

Find Barcelona on the New York State road map. Now follow the road down to Chautauqua Lake. Long ago the Erie Indians used this road to travel from Lake Erie to Chautauqua Lake. Today this road is Route 17. Can you solve the following energy problems to discover how the Erie Indians used energy to travel? How do we use energy to travel?

1. It is 6 miles from Lake Erie to Lake Chautauqua. An Erie Indian would use up 85 Calories every mile to walk those 6 miles. How much energy would he or she use in all?

   Answer: _____ Calories

2. You might use up a total of 6 Calories to drive the entire 6 miles by car. How many Calories would you use to drive 1 mile?

   Answer: _____ Calories

3. Mark which is greater—the energy used by the Erie Indian to walk 6 miles or the energy used by you to drive the same 6 miles. Use >or<.

   Answer: Indian _____ You

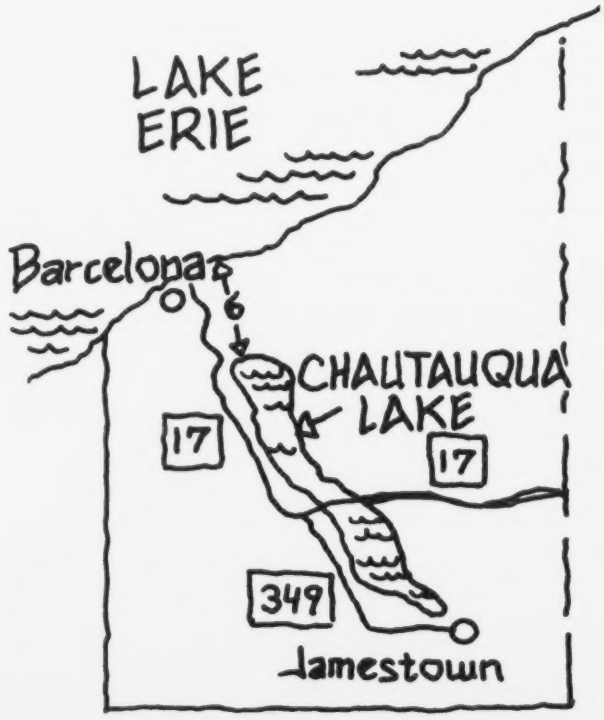
4. You could also ride the 6 miles on a bicycle. If you rode very quickly you might use up 900 Calories to do this. How many Calories would you use to ride 1 mile?

   Answer: _____ Calories

5. Native Americans grew corn and beans to make Misickquatash. Today we call this succotash. Add up the Calories to find out how many are in this simple succotash.

1 cup corn	172 Cal.
1 cup lima beans	188 Cal.

   Answer: _____ Calories



6. How many miles would an Erie Indian have to walk to use up the Calories in this succotash? (Remember, walking a mile uses 85 Calories.)

   Answer: _____ Miles

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Name _____

An Early American Day*

Take a look at a day in the life of Laura, an imaginary kid from Massachusetts, who lived about 150 years ago. As you read, try to get a picture of how she worked, traveled, and played. Think about how she and her family prepared their food and what they ate. Did they use their own energy or energy from machines?

* * * *

It is a crisp Thursday morning in October, 1820, in a small Massachusetts town. Laura has a busy day ahead helping with family chores and getting ready for her birthday celebration tomorrow.

Laura awakens at sunrise and tumbles down from her loft to begin her morning work. She fetches a pail of water from the pump in the yard and gathers fresh eggs from the henhouse. Laura and her younger brother take turns milking the cow and carrying in logs for the fireplace. They will not be going to school today because the whole family is needed to help with the chores and harvesting.

Laura and her four brothers sit down to a heavy breakfast of leftover stew, corncakes, and apple cider. When they finish eating, her brothers head out to chop some firewood. They will also help their father bring the animals out to pasture and mend the fences. In the meantime, Laura washes the dishes and sweeps the house, and then goes to work with her mother in the kitchen garden.

Laura picks ripe pumpkins and squash off the vines near the house and pulls up carrots and turnips nearby. Then she carries several loads of these vegetables down to the root cellar to store away for the long winter months ahead. She and her mother will be drying corn and beans out in the sun later this week, and stringing up apples to dry in the attic over Laura's bed.

*Carol Bershad and Deborah Bernick, ***From the Inside Out: A Kid's Guide to Food and Physical Fitness,*** Illustrated by Heidi Selig (Management Sciences for Health/Newton Public Schools, 1979). Reprinted with permission. Available from Learning for Life/MSH, Dept. CU2, 165 Allandale Road, Boston, MA 02130.

By mid-morning, it is time to churn the butter for the apple pies for her party. Laura skims the cream off a jug of fresh milk and pours it into a large wooden churn. She sings out, "Come, butter, come," as she pushes the heavy dasher up and down for half an hour, working hard until the creamy butter finally appears. Laura and her mother mix the butter with flour and water to make enough pie dough for several pies. They roll out the dough, fill it with apples from the orchard, and put the pies in the oven to bake golden brown.

Around one o'clock, Laura helps her mother serve the family the midday meal. Her father and brothers come back from their work in the fields to share a dinner of salt beef, squash, carrots, and corn bread. The dessert is a special treat of Indian pudding made with eggs, cornmeal, and a bit of the molasses that Laura's mother traded several wheels of cheese to buy. Lunch is the main meal of the day, a time when the whole family can get together to talk and rest before the afternoon work begins. Supper will be a light meal, with meat and vegetables depending on the season.

During the afternoon, Laura walks a mile down the road to invite her neighbor's family to the party. They promise to come after they finish helping out at a barn-raising. On her way back, Laura passes some farmers in their wagons riding to the market in town. A group of children are playing tag and rolling hoops nearby. Laura has no time to join them today, since she has to finish all her chores before sundown.

By the end of the day, the whole family is tired. On a long summer evening, there might still be enough daylight for Laura to work on her corn husk doll or for her brothers to whittle away at their walking sticks and whistles. But darkness comes early in the fall, and candles are too expensive to use for unnecessary activities. Besides, everyone needs to get a good night's rest tonight before the big party tomorrow. By eight o'clock, the whole family is sound asleep.

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Name _____

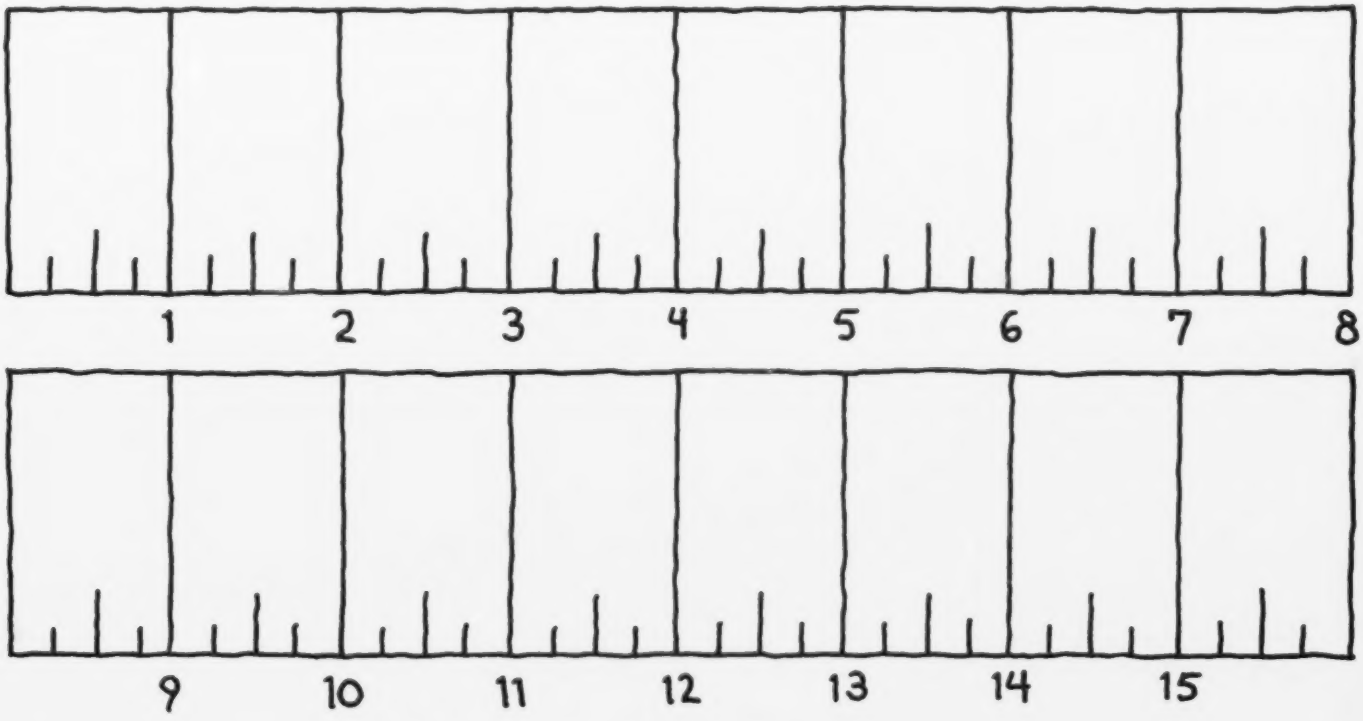
My Travel Log of Energy

_____

Where I'll Start

_____

Number of Miles I'll Travel



_____

Where I'm Going

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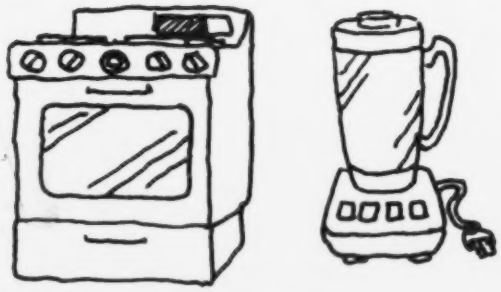
R

Name _____

Different Dinners

Yesterday



TODAY

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The Iroquois Legend of Maple Syrup

Long ago when the earth was new and the Iroquois were first placed here, they were given many gifts. Among the first was the maple tree. The Creator said to the people, "I have given to you certain kinds of foods that will sustain you for the rest of your lives. One of the gifts is the maple tree, which will show you the first sign of life after a long winter. For this gift, I would expect you to gather your families and give respect to the maple. That respect will be in the form of a feast for which you will prepare foods using the sap from the tree." He then proceeded to show the people how to tap the tree and prepare various dishes. Each winter before the spring thaw comes the Iroquois tell their children many stories of how things came to be, among them the story of the maple tree and how she was chosen as the first sign of life after a long and hard winter. For her gift she was also chosen to be recognized as the leader of the trees.

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